THE AMERICAN
JOURNAL OF PHARMACY.

SEPTEMBER, 1875.

REMARKS ON SOME OINTMENTS.

BY JOSEPH COOK EVANS, PH.G.

(*From an Inaugural Essay.*)

Ung. Hydrarg. Nitratis.—This ointment, I find, is not much improved by the omission of the neat's-foot oil, in the "Pharmacopœia of the United States," 1870. On the contrary, I find that it is much impaired, as it soon hardens and changes in color. I have lately prepared it by the "U. S. Pharmacopœia," 1860 process, and have some on hand that has been made for three months, and it does not show the slightest change, being perfect in color, odor and consistence. I think that the temperature given in the "Pharmacopœia" is too high; I always add the mercurial solution to the melted fat when the latter has reached the temperature of 180° F. The reaction does not occur immediately, but in a few minutes the temperature commences to rise, and the reaction begins. The temperature rises considerably over 200° F. To this point, I think, I can ascribe my success in making this ointment.

Ung. Zinci Oxidi Benz. has been prepared by me by the following formula for the past two years, and I have yet to see the first lump or semblance of one in it, when the directions are carefully followed.

℞.	Zinci oxidi,	℥ii ʒv ℈i
	Ol. amyg. dulc.,	ʒxv
	Tincturæ benzoini,	fʒxiv
	Adipis,	℥xiss

Melt the lard, and gradually add the tincture of benzoin, constantly stirring. Triturate the oxide of zinc in a wedgwood mortar until reduced to a fine powder, and make into a smooth paste with the oil, then strain the melted benzoated lard into the mortar, and stir constantly until hard.

Ung. benzoini, as prepared by the last "Pharmacopœia," is, without doubt, a great improvement on the old process of digesting the benzoin in the heated fat. The present ointment possesses the advantages of being lighter in color and prepared much more expeditiously. But in the "Pharmacopœia" process there is one defect, viz., that mentioned by Mr. Wilder in the September number, "Journal of Pharmacy," 1873, page 391. The tincture and lard are heated together until a precipitate or deposit commences to form, and the odor of alcohol is no longer perceived. Then strain the ointment, and stir until cold.

Ung. Hydrarg. Oxidi Rub.—The following formula yields an unobjectionable preparation :

℞.	Hydrarg. ox. rub.,	℥i
	Ol. amyg. dulc.,	℥ii
	Ung. benzoini,	℥vi ℥vi

Rub the red oxide of mercury in a mortar to a fine powder, and triturate well with the oil. Melt the ointment, and pour into the mortar, and stir until cold.

Ung. Hydrarg. Ammon.

℞.	Hydrarg. ammon.,	gr. 320
	Ol. amyg. dulc.,	℥ii
	Ung. benzoini,	℥vii ℥vi

Rub the ammoniated mercury into a smooth paste with the oil, and add the unguentum benzoini, previously melted, and stir constantly until cold.

Cerat. Plumbi Sub Acetatis.—This cerate is best prepared by the formula of Mr. A. P. Brown, "Amer. Journ. Pharm.," February, 1873, page 86. When first dispensed some physicians found fault about the color of it, but when it was explained to them they were loud in their praises of it. The following is the formula :

℞.	Ung. benzoini,	℥viiiss
	Ceræ flavæ,	℥iiiss
	Sol. plumbi sub acetat.,	f℥iiss
	Camphoræ,	℥ss

Melt the wax and ointment in a water-bath, add the solution of sub acetate of lead gradually, digest for fifteen minutes, stirring it constantly, remove the mixture from the fire, stir it till cool ; lastly, add the camphor.

UNGUENTUM AQUÆ ROSÆ.

BOSTON, August 4th, 1875.

Editor of the American Journal of Pharmacy:

The trouble which most pharmacists find in making ung. aquæ rosæ is well known, and several substitutes for it have been offered. Until recently I have been in the habit of using the substitute mentioned in the "U. S. Dispensatory," until my eye fell on an egg-beater in operation, and the thought suggested itself to me to use it in making the official ointment. I tried it, and with the best success; it produced an ointment which I consider perfect. I have kept it in the store with no special care for three weeks, and it showed no sign of separation of the rose-water. The beater works with a crank, which moves two triangle-shaped wires, one revolving within the other. I have also used the beater with other ointments, and have invariably obtained them finer and smoother than by any other process tried.

Yours, respectfully, E. C. MARSHALL, PH. G.

CHEAP DRUGS.

In a recent article in the "American Journal of Pharmacy," entitled "*Examination of Quinia Pills*," is the following statement: "The results, as given below, strongly indicate that, in our present questionable practice of allowing the wholesale manufacturer to prepare those articles which should, properly, be made in the laboratory of the individual pharmacist, we must exercise the most scrupulous care to guard against impositions which are sure to be attempted on the profession and the community at large."

Now, it occurs to the writer that an assertion of this kind calls in question the integrity of a highly respectable class of manufacturers, and institutes an invidious comparison between the "*wholesale manufacturer*" and the "*individual pharmacist*," without sufficient cause.

That there may be dishonest makers of quinia pills, it is no part of my purpose to dispute; but that there may be unscrupulous pharmacists is also quite clear; so that the community is subjected to a certain amount of risk in the hands of either.

That there are pill manufacturers of the strictest integrity is so well known as to require no testimony at this time, and there cannot, possibly, be any difficulty in procuring articles from them of standard purity and full strength; so that, unless the "*individual pharmacist*" is

a better man than the "*wholesale manufacturer*," the suggested change would not be an improvement.

We entirely coincide with the opinion expressed by the writer whose words we have quoted, that the *purchase* of articles by the *pharmacist* which *should properly* be made in his own laboratory is a "*questionable practice.*" Every well-ordered dispensing-store should produce as many of the preparations of the "Pharmacopœia" as time, space and reasonable convenience of apparatus will permit.

A large number of articles, such as tinctures, syrups, cerates, fluid extracts, etc., can be prepared by the apothecary with as much economy as would result from the purchase of them. Besides, it is a duty to instruct apprentices in this branch of their profession.

There is, however, quite a list of officinal preparations, which, to be produced economically, and up to the market standard of purity and appearance, require to be made on an extensive scale, with all the advantages of costly apparatus, space and capital united.

We cannot censure the apothecary because he prefers to buy his quinia, morphia, strychnia, tartar emetic, chloroform, ether, essential oils, etc., in place of manufacturing them for himself at a pecuniary loss, and at a great sacrifice of time; his reward being only the satisfaction of having made them himself.

The difficulty, it appears to us, lies in the fact that the subdivision of labor, which has wrought such marked changes in all industrial occupations, has not left pharmacy unassailed.

We once made our own blue mass and mercurial ointment, powdered our own ipecac, jalap and asafœtida. Where will we find an advocate for a return to this system?

No practical business man in the drug trade can be ignorant of the fact that in the manufacture of such articles as the salts of quinia, morphia, and strychnia, preparations of mercury (as calomel, corrosive sublimate, red precipitate, etc.), a great deal of space, a large amount of capital, and a degree of skill to be acquired only by long experience and close attention, are required.

They must be produced in quantity to be ready for the demands of consumers, and they must be of uniform purity and appearance. That the ordinary apothecary could not meet these requirements must be so evident that it is unnecessary to enlarge on this point.

That the sophistication of medicines is a most serious matter cannot be disputed, and that it is deserving of the severest condemnation no right-minded man will question.

Among the various causes that have produced such a result, there is one to which I propose to refer, namely, the disposition on the part of *buyers* to cheapen prices; and here the "*individual pharmacist*" is quite as open to criticism as is the wholesale dealer, and it is simply a fact that, if the pharmacist desires strictly pure goods, he need have no difficulty in finding sellers equally as upright as himself.

One of the axioms of a certain class of political economists is to "buy in the *cheapest* and sell in the *dearest* market."

As every man in business aims to make money, the advantage to be derived from buying at *low* and selling at *high* prices is obvious. It is well to remember, however, that while judicious purchasing has much to do with ultimate gains in commercial transactions, a due regard should be had to *quality* as well as to *prices*; and it is unquestionably a fact that the wide-spread disposition of the times to cheapen prices has a tendency, in many cases, to reduce the quality of the merchandise below the proper standard.

In no line of business is this more apparent than in that of drugs and chemicals, and yet nowhere should greater care be exercised by all concerned than in this particular branch of trade.

It is, comparatively, of little consequence if many classes of goods fully meet the requirements or not, because, at the most, only a *pecuniary* loss can be sustained; but, in the case of medicines, where human life is jeopardized, the responsibility is far greater, so that every one should realize, that in the business of the manufacturing chemist, and the wholesale and the retail druggist, there is an important element to be considered, entirely unknown in most departments of trade.

Hence, chemists and druggists should aim to prepare and sell only goods of standard purity; and as *all* are in business for profit, there should be a general disposition to pay a fair price for a good article.

Any one who has an extended experience knows full well that the complaint is universal, at this time, in the drug business as to the small profits and the sharp, not to say *unfair*, competition; so that there is but little encouragement for beginners, or even for those long-established; and, unless there may be articles of a proprietary character available, the drug trade offers but scanty remuneration for the outlay of capital, the time and experience necessary, still less for the peculiar responsibility that attaches to the manufacturer, the wholesale and the retail dealer.

It is, therefore, greatly to be deprecated that it too often happens that the price sells the goods, and quality is a secondary consideration.

The tendency, as we stated, seems to be to *cheapen;* the result must be that the quality will run down to keep pace with the price, and as the Indian naïvely explained, "*Poor pay, poor preach,*" so poor pay will be likely to bring poor drugs.

In making an analysis of the cause of, as we fear, an *increasing* demand for cheap drugs, we cannot ignore the almost every-day experience in our own business relations—an experience which, to the credit of the dispensing trade be it said, is not universal, but yet is so widely extended that it is bringing forth its fruits. Such remarks as the following are so frequent that we presume but few dealers are not familiar with them. "Your products are entirely satisfactory; we believe them to be pure and well prepared; we do not question the fairness of prices as related to quality, but we are offered goods SAID TO BE PURE by other manufacturers at a less price; our competitors are selling them and *we* have sold some, and hear no complaints; we must compete with those who sell cheap goods or lose our trade—and we cannot afford to pay your prices."

Now this may not induce *some* makers to deviate from their settled determination to make only strictly prime goods, but it is certainly true that the pressure is too great for others to resist, and as a result the cheap buyer can generally be accommodated somewhere.

To the consumer such a condition of things is far from satisfactory. His position is very much like that of the frogs in the fable, who were stoned by the boys—it was fun for the boys, but death to the frogs.

The PUBLIC demand, certainly, is not for cheap medicines, at the expense of efficiency; but we fear that sharp competition has dimmed the vision of many who should keep ward over the "Pharmacopœia," the necessities of the sick and their own consciences.

"UNUSQUISQUE."

THE PREPARATION OF MEDICINAL SYRUPS BY COLD PERCOLATION.

BY ROBERT HUNSTOCK.

Ever since pharmacy has been promoted to the standard of a profession, it has been the desire and effort of the enthusiastic pharmacist to have syrups possessing not only official strength, but also pleasant appearance, perfect consistence and stability. During the past ten years there have been innumerable processes presented, but none, I believe, has thus far appeared which thoroughly answers the above demands.

The process that I am about to describe is originally the invention of Mr. L. Orynski, and was published in the "Druggists' Circular" of March, 1871. The process which he there suggested is much easier and economical than the process of the "Pharmacopœia," and, I think, fills all the vacancies which the latter cannot possibly approach, namely, *syrups of official strength*, *transparent appearance*, *perfect consistence* and *unlimited stability*.

Having paid much attention to the modification and improvement of the valuable invention of Mr. Orynski, I feel confident in recommending the following process to the perusal of the readers of the Journal, and sincerely hope they will try the improved process as laid down; if the directions are strictly followed, success alone can be the result.

The kind of sugar to be used is the so called "crushed," or even coarsely granulated; but very finely powdered will not answer, as the pressure of the solvent exerted on the sugar has the tendency of bringing the particles in such close contact as to render it impenetrable by it. The quantity to be used is, in all cases, the same as is prescribed by the "Pharmacopœia."

In the preparation of all syrups, it is very essential to provide for the transparency of the menstruum. For simple syrup, only the purest and clearest water obtainable should be used; *the purer and clearer the menstruum*, *the more crystal-appearing the product*.

The first step in the process is to procure a conical percolator of the required size. Introduce lightly in the lower orifice a loose piece of sponge, previously moistened with water. The sugar is then to be placed into the percolator, a well fitting cork inserted at the mouth of the lower extremity, and the liquid to be converted into syrup poured on. The percolator is then securely covered, and set aside in a moderate temperature, until the sugar has melted down to less than half its former bulk. Then the cork can be removed and the liquid allowed to drop. It is always best to return the first four or eight ounces that pass to the percolator, in order to guard against impurities which may exist in the sponge. If the sugar is not all dissolved when the liquid has passed, return the quantity percolated, until that end is perfected. It is hardly ever necessary to return the percolated syrup more than once, if the sponge is properly inserted. The time consumed is not as long as if it were made by boiling on the gas furnaces generally found in the laboratory, and the product is a transparent syrup of a fine con-

sistence and possessing treble the stability of the syrups made the usual way.

In preparing the various syrups of the "Pharmacopœia" by the foregoing process, it is advisable to note the following particulars: The syrups of gum arabic, orange-peel and flowers, tolu, lemon, rhatany, wild cherry, garlic, sarsaparilla, ginger and squill are all treated according to the "Pharmacopœia," till that part where boiling the sugar in the mestruum is directed is arrived at; here the menstruum, impregnated with the medicinal or fragrant virtues of the drug, is poured on the sugar and treated as above directed.

For syrup of red rose, I would suggest that the sugar be first percolated with the mixture of extract and water, obtained as per "Pharmacopœia," and the first portion of the tincture added lastly to the prepared syrup.

A practical and economical process for syrup of iodide of iron is as follows:

Take of	Iodine, ...	3 troyounces
	Iron (in wire and cut in pieces), . . .	300 grains
	Distilled water, a sufficient quantity,	
	Sugar, ...	13½ troyounces

Mix the iodine, iron and three fluidounces of distilled water in a suitable glass vessel; when the reaction has ceased, filter, and add six fluidounces of distilled water to the filtrate; pour this on the sugar previously deposited in a percolator, as directed in the general process. When the liquid has passed, and the sugar is all dissolved, add sufficient distilled water to make the whole measure twenty ounces. While proceeding with the above process, care must be taken to complete it as quick as possible, and to carry it on in a dark-glass percolator. Lastly, it may be filled into small (two or three ounce) dark-glass bottles * and a bit of iron wire added to each.

Thus far we have been bordering on an impossibility to procure, by the formulas commonly in vogue, a compound syrup of squill that will stand unaltered by time and temperature. The formula that I am going to present does not even claim to be perfection on these material points, but it does claim to far exceed the present official formula in attaining that end. The drugs (squill and seneca) are powdered, macerated and percolated, evaporated, mixed with water and filtered according to the

* The syrup is decomposed by the atmospheric air, but not by light; see papers in this Journal for 1854, 1855, &c.—EDITOR AMER. JOURN. PHARM.

"Pharmacopœia." The sugar is then dissolved by percolation in the menstruum thus obtained; the tartrate of antimony and potassium dissolved in a small quantity of boiling water and added to the syrup; lastly, the quantity required is made up by the addition of pure cold water.

If the above general process is strictly adhered to, nearly all syrups (official and officinal) can be made by it. It will also be seen, on the first application of this process, that it is the *cleanest*, *handsomest* and *most economical of all the processes thus far placed before the profession*, and it adds largely to the filling of a vacancy in the art of pharmacy so long admitted to be an impossibility.

St. Louis, August 14th, 1875.

SOME SUGGESTIONS TO THE NEXT REVISION OF THE "UNITED STATES PHARMACOPŒIA."

BY H. M. WILDER.

Acidum Phosphoricum Dilutum.—One of the formulas ought to be omitted, since, however therapeutically they may be identical, pharmaceutically they differ in their behavior to tinct. ferri chloridi (*see* "Proceedings Am. Pharm. Assoc.," 1874, pp. 431 and 511).

Syrupus Krameriæ.—A similar objection can be made, since the syrup made with aqueous extract mixes clear with water, whilst that from the fluid extract gives a turbid mixture.

Tinctura Croci.—It is a well-known fact that most of the elder physicians have been disagreeably surprised by finding that saffron has been left out of tinct. cinchon. comp. (in the edition 1873), of which it formerly was a constituent. It is therefore proposed to add a tincture of saffron to the list. The proportion of 1 saffron, 6 alcohol, 2 water (that is 1 to 8), would be convenient; or perhaps 1 to 10 would be better, since we probably by-and-bye will have to do everything on the "*ten*" system. When needed, add to each fluidounce of tinct. cinchon. comp. (1873) 25 minims tincture of saffron (= 3 grains).

CHEMICAL ANALYSIS AND VALUATION OF GRAPHITE.*

BY DR. G. C. WITTSTEIN.

When it is desired to find the quantity of carbon contained in a specimen of graphite, the theory of simply exposing the substance, free

* Reprint communicated by the author, and translated by P. H. Dilg.

from water, in an incandescent state, to the air, will probably present itself to the mind at first glance. Practice, however, does not confirm this; as even small particles of graphite, after being exposed for several days in a crucible to the action of a high heat, are not entirely consumed.

Although the elementary analysis performed either with CuO, finally in a current of O, or with $PbCrO_4$, meets all that is required in this respect, nevertheless the method which Berthier recommends for determining the combustion value of a substance is far preferable, as being simpler, more convenient, and technically accurate enough.

Triturate in an agate mortar 1 gram graphite, as fine as possible, with 25 grams finely-powdered litharge;* introduce the mixture into an unglazed, tapering porcelain crucible; cover it with 25 grams more PbO, attach the lid, and expose to a slow heat on coal, when, after some foaming and effervescing, complete fusion will be attained in about ten to fifteen minutes. The reduced lead is united to a single lump at the bottom of the crucible, and may, after cooling, be readily separated with a hammer from the sides of the crucible and the adhering litharge. 34 parts reduced lead are equivalent to 1 part of carbon.

Frequently it is found necessary to determine quantitively the other constituents of graphite besides carbon. To achieve this result by a single analysis, avoiding the above-described treatment with lead, I have used the following process with good success: 1 gram of finely-pulverized graphite is heated to a dull-red heat, the loss thereby sustained being calculated as water; then triturate intimately with 3 grams of a mixture of equal parts of carbonate of potassium and of sodium: introduce the whole into a platinum crucible, cover with 1 gram of potassium hydrate or sodium hydrate, and gradually heat to incandescence; the mass thereby melts, foams, and forms a crust on top, which is occasionally pressed down with a strong platinum wire. After fusing for half an hour, allow to cool; soften the mass with water, and heat for fifteen minutes nearly to boiling; filter, lixiviate, and set the entire liquid aside.

The object of fusing with the alkalies is to entirely separate the admixtures insoluble in acids, as clay and quartz. Whether by this

*As commercial litharge sometimes contains metallic lead, it should be tested for it by treating it with acetic acid, whereby the metal remains. In case such impurity occurs, and no pure PbO is at hand, it is necessary to determine the amount of lead and deduct it from the result obtained in the manipulation.

process the clay is entirely, partially, or not at all lost in the alkaline lye, is a question of little importance, because it will undoubtedly be dissolved by the following action of HCl; the silica, on the contrary, should be entirely dissolved; although, taking in consideration the applied treatment, that result could be expected, still I was not quite successful. A re-fusion of the residue would probably have extracted the small amount of silica remaining, but further investigations led to the conclusion that it was not needed.

That the graphite would not stand the melting without some loss was foreseen, and proved itself by the continual bubbling of the mass; the loss of carbon thereby experienced was of not much consequence to the result of the analysis, as all the other constituents can readily be determined by weight; the final loss is considered carbon, and added to the previously obtained carbon.

After the residue in the filter has been well washed with water it is dried and introduced into a small flask, the ashes of the filter, to which traces of the substance adhere, and about 3 grams of HCl, of specific gravity 1·12, being added. After a few minutes a feeble gelatinizing of the liquid is perceptible, caused by the decomposition of the little alkali-silicate which was not removed by the lixiviation. If a small amount of HCl be added, the precipitate disappears again, leaving the silica in solution. After digesting for about an hour, dilute with water, filter and wash; the substance remaining on the filter is pure graphite-carbon, which, after being dried and heated to a dull incandescence, is weighed.

Unite the acid filtrate with the previously obtained alkaline filtrate; add a sufficient quantity of HCl to impart an acid reaction; evaporate to dryness and determine the silica, clay, FeO, etc., in the usual manner. After treating two samples of graphite by the above-described method, they showed the following composition:

	I.	II.
Carbon,	58·04	68·20
Silica,	13·10	5·33
Clay,	10·70	6·11
Oxide of Iron,	2·74	2·20
Lime,	0·05	0·03
Magnesia,	trace	trace
Loss (Carbon)	13·55	12·53
Water,	1·82	5·60
	100·00	100·00

Consequently specimen No. I contained 71·59 per cent. carbon, while specimen No. II contained 80·73 per cent.

GLEANINGS FROM THE EUROPEAN JOURNALS.

BY THE EDITOR.

Decomposition of Chloroform.—Mr. Jaillard, military pharmacist, believes that the spontaneous decomposition of chloroform is caused by the presence of moisture, and may be explained by the following equation: $CHCl_3+2H_2O$ yield $3HCl+CH_2O_2$. That hydrochloric and formic acids are the decomposition products may be proven by agitating some altered chloroform with half its volume of distilled water, and treating the aqueous liquid with some solution of nitrate of silver, when a white curdy precipitate, soluble in ammonia and insoluble in diluted nitric acid, is obtained. To the filtrate, an excess of the silver solution is added and the mixture heated to boiling, when a black precipitate of metallic silver will indicate the presence of formic acid. Chloroform thus altered is purified by washing it carefully with potassa solution, and after decanting, distilling it over chloride of calcium.—*Rép. de Pharm.*, 1875, p. 391, from *Mém. ph. Mil.*

Zinc in Vinegar.—Jaillard reports some cases of poisoning, accompanied by weakness, headache, diarrhœa and vomiting, the causes of which were traced to the use of vinegar in which he found acetate of zinc corresponding to 3·2 parts of the metal in 100 of vinegar, which had been kept for some time in a zinc vessel.—*Ibid.*, *p.* 392, from *Ibid.*

Constituents of Mahogany-wood.—Latour and Paul Cazeneuve have examined mahogany-wood (*bois d'acajou*). Deprived of the hygroscopic water, the sawdust was exhausted with ether, from which an amber-yellow extract was obtained which dissolved in boiling water, yielding, on cooling, crystals of catechin. The exhausted sawdust yielded to cold water a red-brown extract, which contained a small quantity of catechin, yellow coloring matter, and an astringent principle analagous to catechu-tannic acid. The exhausted sawdust yields to alcohol a red principle of acid properties, dissolving in alkaline carbonates with a carmine color, and resembling in its properties rubinic acid and cinchonic red.

With hot water 12 per cent. of dry extract is obtained from mahogany sawdust; nearly one-half of the extract (5·8 per cent.) is soluble in cold distilled water.

By maceration with cold water, 6·5 per cent. of dry extract is obtained, which is readily soluble in water, but by percolation a larger amount (8·5 per cent.) of extract, which is less soluble in water. The first third portion of the percolate deposits, on standing, an abundant precipitate, from which a notable proportion of catechin may be separated; the last two-thirds of the percolate remain clear on standing.

Alcohol of 85 per cent. dissolves much catechin and yields a carmine-red extract.

When the aqueous extract is dissolved in hot water, neutral acetate of lead yields a colored precipitate, from which, by treatment with sulphuretted hydrogen, catechu-tannic acid is obtained, and an acid principle of a carmine color, insoluble in water, but soluble in alcohol and alkalies. After the removal of the colored principles by sugar of lead, subacetate of lead gives a white precipitate, which, by treatment with sulphuretted hydrogen, filtering and concentrating in a current of carbonic acid gas, yields catechin having the composition $C_{20}H_{18}O_8,H_2O$ and the properties as ascertained by Zwenger. It appears from the above that the extract of mahogany-wood has the same composition as catechu, and may probably be used as a substitute for the latter.—*Ibid.*, pp. 417–421.

Urochloralic Acid is the name given by Musculus and De Mermè to a constituent of the urine after chloral hydrate has been taken. The concentrated urine is treated with some muriatic or sulphuric acid, and then agitated with alcoholic ether, which dissolves the new acid. This has a strong rotatory power to the left, crystallizes in stellate groups of needles after the complete removal of the nitrogenated compounds, has a strong acid reaction and decomposes the carbonates with effervescence; it is freely soluble in water and alcohol, less in alcoholic ether, and nearly insoluble in pure ether. At the boiling temperature it reduces alkaline solutions of copper and bismuth, also silver salts and decolorizes sulphate of indigo. It is easily decomposed by heat, becoming yellow at 100° C. (212° F.). Crystalline salts of potassium, sodium and copper have been obtained, the barium salt is amorphous; all are soluble in water and insoluble in absolute alcohol.—*Ibid.*, pp. 422–424.

Ferrated Cod-liver Oil.—C. Bernbeck proposes for this purpose to prepare oleinate of iron which may be kept for a long time without alteration. A pure olive oil soap, the neutral behavior of which has been previously ascertained by moistening it with some solution of cor-

rosive sublimate, is dried in thin slices at a temperature of 30° to 40° C. (86° to 104° F.); it will then still contain about 12 per cent. of water. One part of this soap is dissolved in 20 parts of boiling distilled water, strained, and a solution of one part of ferrous sulphate in 10 parts of water added, with continued agitation. The whitish-grey precipitate, which, in contact with the air, speedily turns greenish and finally brown, is rapidly collected upon linen, washed and expressed. This press cake is externally red-brown from ferric oleinate, internally grey (ferrous oleinate), and does not alter on keeping. To prepare the ferrated oil, four parts of this oleinate of iron are fused by means of a steam-bath, when 96 parts of cod-liver oil are added in small quantities and the heat continued for about 45 minutes; it is then filtered, or, better, allowed to settle in a closed vessel, and decanted.

Thus prepared, ferrated cod-liver oil has a mild taste, and contains the iron mainly as a ferrous salt; it contains about 1 per cent. of metallic iron.—*Archiv d. Pharm.*, 1875, July, pp. 21–23.

Adulterated Oil of Cloves was noticed by Ed. Schaer. It had the spec. grav. 0·960, and boiled between 165° and 170° C. (329° and 338° F.), at which temperature about one-half distilled over, when the boiling-point rose to 235° and 245° C. (455° and 473° F.). Pure oil of cloves varies in spec. grav. between 1·03 and 1·06, and boils between 240° and 255° C. (464° and 491° F.), its carbohydrogen boiling between 251° and 255° C., and its oxygenated portion (eugenol or eugenic acid) at 252° (according to Stenhouse at 242° C.).

The above oil was, therefore, adulterated with at least 40 per cent. of a lighter oxygenated oil, the nature of which was not determined, the smell being hidden by the odor of oil of cloves, which had distilled over.—*Schweiz. Wochenschr. f. Phar.*, 1875, No. 25.

Iodine in liquids containing tannin cannot be detected by starch paste. Tessier recommends to add to such liquids in a watch-glass a little ferric sulphate, and to cover the glass with paper coated with starch paste. Tannate of iron will be precipitated, and a blue color imparted by the iodine to the paper cover.—*Phar. Cent. Halle*, 1875, No. 23, from *Jahresb. Phys. Ver. Frankf.*

Tarry products in ammonia are detected by adding some ammonia drop by drop to some colorless nitric acid, previously diluted with one-fourth its volume of water. Toluidin and anilin, which are nearly always present in ammonia water made from gas liquor, impart at once

a red coloration, which gradually passes into brown; at the same time vapors are evolved which have the odor of tar. Muriatic acid will cause a red, and sulphuric acid a dark-brown coloration, with such ammonia; but the test with nitric acid is more delicate. Kupfferschläger.—*Ibid.*, No. 24.

Bleaching of Sponges.—R. G. recommends to remove the lime by immersing the sponges in muriatic acid, and, after washing them with water, to dip them for five or ten minutes into a solution of one part of permanganate of potassium or sodium in forty-five of water. The sponges have now a brown color, due to precipitated manganic oxide, which is removed by very diluted sulphuric acid, or, preferably, by a solution of one part of oxalic acid in fifty of water to which a little sulphuric acid has been added.—*Zeitschr. d. Oster. Apoth. Ver.*, 1875, No. 19.

The Innocuous Properties of some Aconites.—The statement on page 8 of "Flückiger & Hanbury's Pharmacographia," that the poisonous qualities of *Aconitum napellus* are not developed in certain localities, forms the subject of an interesting essay by Prof. C. D. von Schroff. According to his views, the poisonous properties of aconite (and other plants) are not materially affected when growing wild in different localities, provided the position be a natural one. In Lapland, the leaves of *Aconitum septentrionale*, Koelle, which may be regarded as a variety with blue flowers of *A. lycoctonum*, Lin., are used as a pot-herb; Schroff, Jr., obtained (1871) from the root of the Norwegian *A. septentrionale*, a very poisonous bitter alkaloid, while the herb contains the same principle in such a minute quantity that it cannot be regarded as poisonous, except in very large quantities. *Ac. lycoctonum* shows the same relation of the root and herb.

Hooker states, in his "Flora of British India," that the roots of *Aconitum multifidum* and *Ac. rotundifolium* are eatable; and Royle describes the former plant as being allied to *Ac. anthora*, the root of which was formerly medicinally used as a tonic. Aconite, it appears from these accounts, does not become innocuous when growing in particular localities; but the root and herb of some species of *Aconitum* are destitute of poisonous properties.—*Ibid.*, Nos. 19 and 20.

A New Insect Powder.—*Ledum palustre*, Lin., in its fresh and dried state destroys insects, and the tincture, externally applied, allays the itching and pain produced by the stings of insects; it should be collected while in bloom.—*Ibid.*, No. 21.

LEGITIMATE PHARMACY.

Read before the New Jersey Pharmaceutical Association, in answer to the Query: "What is Legitimate Pharmacy, and how far is the Sale of Fancy Goods, Liquors and Cigars compatible with it?"

BY H. P. REYNOLDS.

A practical consideration of this question, fortunately, does not necessitate a study of the etymology of the word "pharmacy," whereby we might be left in doubt if it were not as properly used to designate a black art as a science, yet I conceive that it is not, after all, so easy to give a definition satisfactory to a high professional requirement, and at the same time freely rendering the popular understanding.

In most European countries the art is exactly defined as well as regulated by law, while with us both definition and regulation, with slight exceptions, are only such as custom prescribes.

In the text books, pharmacy is said to be the art of collecting, preparing and dispensing medicinal substances—a definition objectionable, inasmuch as, under its terms, the making and vending of nostrums is legitimate pharmacy, while the higher law embodied in the code of ethics of our own and kindred societies, whose chief end is the advancement of the art, emphatically condemn them.

The ideal of intelligent and progressive pharmacists then, requires no less than the defining of legitimate pharmacy as the art of collecting, preparing and dispensing medicinal substances by approved scientific methods, with the essential purpose of alleviating human suffering and of promoting human comfort, in the confidence that so worthy a pursuit, worthily conducted, will not fail of a sufficient reward. In a calling with this dual phase, professional as well as mercantile, that man is out of place who does business *only* for the sake of making money, for he cannot grasp its higher purpose and will fail of its highest reward.

It may, however, be said, with a show of reason, that while it is well to get up a lofty standard, in practice it is not always possible to abide by it, that the competitions of business life, the impossibility of gaining a livelihood in sparsely-settled communities, by a devotion to a pursuit too-rigidly restricted, render necessary the extension of the mercantile features; and we are here brought squarely up to a consideration of the second clause of our query, viz., how far is the sale of fancy goods, liquors and cigars compatible with legitimate pharmacy?

Without wishing to prescribe or even suggest regulations for the

control of others, not even professing to offer my own practice as a basis for my theories, I desire to meet the question with perfect candor on its own merits; and in this spirit are we not compelled to admit that the pursuit of pharmacy is incompatible with the sale of fancy goods, except as to that class produced by processes that can only or best be carried on by pharmacists, such, for instance, as dentifrices, colognes, hair dressings and sundry toilet merchandise, for the purveying of which, as yet, the American public must look to us; and with the further exception of many household goods and devices, which, inasmuch as they are used for the alleviation of suffering, properly come within the scope of our definition; that it is further incompatible with the sale of liquors, except so far as they are to be used for medicinal, mechanical or chemical purposes; and as for the sale of cigars, that it is indefensible on any known grounds save those of supposed business necessities.

It would perhaps be interesting to inquire how the drug business in this country became the miscellaneous medley which we know it to be, finding, as it too often does, accurate descriptions upon the covers of the annuals and almanacs of the patent-medicine men, of whose interesting family literature we yearly become colporteurs. One reads, for instance, "Quackem's Celebrated Dyspepsia Destroyer is sold by Jones & Smith, dealers in Drugs and Medicines, Books, Stationery and Fancy Goods. Prescriptions carefully dispensed"; or, again, "Seller's Oriental Oceanic Optical Drops; sold by Jinks & Johnston, dealers in Fine Drugs and Chemicals, Paints, Oils, Varnishes, Fertilizers, Coal Oil, Lamps and Lamp Chimneys, Pure Wines and Liquors, &c. Prescriptions compounded with care." No matter if the latter so seldom occurs as to excite the whole force, from proprietors to bottle washers, it is well to have the name of the thing.

Nor can the city pharmacist, with propriety, divide the hodge-podge of his rustic brother. Look for a moment how absurd a business can be carried on behind the plate-glass windows and revolving illuminated mortar of the Broadway corner pharmacy. In such a place, one of these winter nights, say, let us follow A, B and C, young men strolling home to their lodgings. They step up to a magnificent marble pile, costing more than the humble home of many a modest citizen, which might serve as the mausoleum of a monarch, daubbed the "Spa," and call for hot soda, which is served them by a white-aproned boy like the *garçon* of a restaurant—for A, coffee; for B, chocolate, while C takes

a little "tonic" in his. Passing behind the Spa, they call upon another boy for cigars, and select each his favorite "Rosa," "Fumar" or "Figaro." A, remembering the parties' sweet tooth, orders a pound of French mixed candy and a package of chocolate caramels, "fresh every day." B crosses the tesselated floor and selects, from a lot of playing cards in the elegant show case, a new euchre deck, and is kindly shown by the attentive salesman (who is also, *perhaps*, an accomplished pharmacist) an extensive assortment of portemonnaies, cigar cases and other beautiful Russia-leather goods, pocket cutlery, meerschaum pipes and smokers' articles and knick-knackery of every deseription. C, meanwhile negotiates at the prescription counter for a bottle of "heid-sick" or sparkling "catawba," and the two resume their homeward stroll. In truth, here, as in the moral drug store where calomel and calico, quinine and guano, tea and opium, clothes wringers and Davidson's syringes, leeches and canary birds are dealt out with equal freedom, the department least depended upon for business success is that of pharmacy.

It is useless, before this body, to enlarge upon a condition of things which all will acknowledge as here truthfully, if feebly, presented, and which, I doubt not, we all regret. It has happened to us to live in a period when a demand has arisen for a re-ordering of this matter; in fact, we are taking, or professing to take, an active part in efforts to that end, and it remains for each one to keep, at any rate, as nearly as he can individually afford, abreast the advancing standard. Since the very preponderance of the mercantile feature allowed in the retail drug business has resulted in the excessive outside competition that renders it now so difficult to win great pecuniary success in that occupation, it becomes sound policy as well as plain duty for each of us to help along the reform movement, and if in our personal business we may deem it as yet incompatible with solvency or success to do away with non-pharmaceutical merchandise, let us endeavor to make the pharmaceutical overshadow and control all other features of it, aiming gradually to discard all that is extraneous, even though it shall not be ours to see, in the flesh, the good time coming in this land when there shall be no doubt as to what is meant by "legitimate pharmacy."

In that time we may be sure that future temperance crusaders will not feel impelled to equal prayers for drug stores and gin mills, for the coming druggist, though not exempt from the need of prayer, will not be charged with pandering to the vitiated taste of the drunkard, by dis-

pensing fraudulent prescriptions of brandy smashes and gin cocktails, any more than (as we trust) he will be charged with conniving at infanticide and abortion, in the display and sale of "deobstruent pills" and "periodical drops."

Although the patent-medicine trade is not attended to in our query, it seems to me it must be taken into account in considering the sphere of true pharmacy, to which, in its present overgrown proportions, it has become an offence and a stumbling-block.

It cannot be denied that the multitude of nostrums forced upon the people by brazen advertising, and by their demand in turn forced upon our shelves, constitute a hindrance, not only to the scientific advancement, but to the financial success of our calling, constantly becoming, as they do, dead stock upon our hands, on account of their fickle and fleeting saleability, and generally offering but small margins of profit as compared with the risk. Now, I conceive that not only duty but policy forbid the pharmacist lending himself or his store as advertising mediums for these medical monstrosities, even to promote that "mutual advantage" which we hear so much about, but which is mutual only for the makers. Neither the cheap melodramatic lithographs of the Sage of Buffalo, with its death-bed scenes, nor the high heroics of Hostetter's St. George and the dragon, nor the cabalistic "S. T. 1860, X," of the Plantation-bitter man, are interesting as works of art, nor do they really serve to embellish clean walls or paint. And the dealer who informs his customer that So-and So's lung balsam will cure his cough, or that the Widow Mickle's soothing syrup is just the thing for that blessed baby, incurs a fearful responsibility. I earnestly hope the time will come when the reasonable demand of the public for domestic remedies can be met in some way to merit the just approval of physicians and druggists, and the patent-medicine fraud be reckoned as a thing of the past. But, until then, and while the demand makes it almost necessary for us to deal in this merchandise, should not the attitude of pharmacists be one of tolerance only? Should it not be the rule of well-regulated pharmacies never to recommend a nostrum, but only to fill the customer's order? Inasmuch as our patrons must rely greatly upon our skilled judgment, it becomes a duty to make no careless recommendations, as also it is a duty to give all reasonable information, and to educate our special public up to the appreciation of the best obtainable drugs and preparations.

In conclusion, sir, will it be considered a trite sentimentality to assert,

before a society bound as ours is by a code of ethics, that our art affords a noble field for the best abilities and the highest professional honor, and that the man who follows it only for the lucre which he can decoct, distil, percolate, filter, express, or otherwise extract, without recognizing the obligations entailed upon him by his position toward science and humanity, would find more congenial employment in the glorious army of patent-medicine men, whose business cannot be said to add anything to the common wealth, happiness and progress?

Plainfield, N. J., February 3, 1875.

FLOWERING OF THE *EURYANGIUM SUMBUL*, KAUFFMANN, IN ENGLAND.*

This important plant is now flowering in the herbaceous ground of the Royal Gardens, Kew, for the first time in this country. It yields the drug "Radix Sumbul," introduced to Russia as a substitute for musk about the year 1835, and then recommended as a remedy for cholera. It became known in Germany in 1840, and ten years later in England. It was admitted into the "British Pharmacopœia" in 1867, and is now prescribed, in the tincture form, as a stimulating tonic. It is said to be a nervine stimulant, like valerian, and to possess antispasmodic properties. Further than the above its history has not been found traceable by the authors of the "Pharmacographia." The plant was discovered in 1869 by a Russian traveler, Fedschenko, in the mountains of Maghian, near Pianjakent, a small Russian town eastward of Samarkand. The root, as found in commerce, consists of transverse slices, 1 to 2 inches, rarely as much as 5 inches, in diameter, and an inch or more in thickness; the bristly crown and tapering lower portions, often no thicker than a quill, are also met with. The Kew specimen is nearly 8½ feet in height. The root-stock is somewhat fusiform in shape, about 3½ inches in diameter at the top, where it is thinly covered with the persistent fibres of the old leaves. Those of the present year commenced to wither soon after the flower-stem became visible, and were quite dead when its full height was attained. They are supradecompound, much as in some species of *Ferula*, especially *F. campestris*, to the leaf segments of which those of the *sumbul* have a very close resemblance. The panicle is composed of about ten alternate spreading branches, the lowest about 5 feet from the apex.

* From the "Gardeners' Chronicle," July 3.

The umbels are on short stalks, with 10—13 umbellules. The stem on being wounded exudes a milky sap, which at first has the exact flavor of angelica, afterwards leaving a bitter taste. The resin of the root does not fully develop its musky smell until after contact with water. It is hoped that seeds may be perfected, and a stock raised for distribution; therefore, the treatment accorded to this plant may be of interest. The root came to hand in a dry and dormant condition, was grown in a pot for the first season, and healthy leaves were produced, but which on the slightest check died away. About three years ago it was planted in its present position, on a small hillock of stones, with plenty of good loamy soil, and there it has since flourished without intermission. During winter, the protection of a hand-glass has been given against rain—doubtless an important point of attention; it has also been covered loosely with leaves, though, as regards temperature, it is apparently quite hardy. A mulching of litter is beneficial during summer, and when the stem rises, weak manure-water should be given. In a state of rest, the roots may be safely sent to a distance, packed quite dry, as a bulb would be. They seem to have a very persistent vitality, and are without fleshy ramifications.—*Pharm. Jour. and Trans.* [*Lond.*], *July* 17, 1875.

AMMONIACAL COMPOUND OF GLYCYRRHIZIN.*

BY Z. ROUSSIN.

The author stated that his attention had been drawn to the subject by the fact that glycyrrhizin, the so-called sweet principle of licorice root, is insipid compared with the root itself. Glycyrrhizin, purified by four solutions in alcohol, and four successive precipitations of foreign matters by ether, appeared, after the evaporation of the alcoholic-etherial liquor, as a yellowish substance, insoluble in cold water, and nearly devoid of taste, only developing in the mouth, after some time, a sweetish sensation, recalling faintly the taste of licorice root. It therefore seemed evident to the author that the substance hitherto called glycyrrhizin is not really the sweet principle of the licorice root in the state in which it exists naturally in the root, where it is extremely sweet in taste and rapidly soluble in water.

It is mentioned in chemical treatises that alkalies give a yellow color, both with glycyrrhizin and with infusions of the licorice root, but it

* From a paper read before the Pharmaceutical Society of Paris, June 2.

does not appear to have been noticed that the sweet taste is not developed in glycyrrhizin except when its solution is effected in alkalies. Dilute solutions of potash and soda determine the solution of glycyrrhizin very rapidly; the sweet taste being quickly developed, whilst the liquid takes a bright-yellow color. If the solution be evaporated in a water-bath it yields a scaly, translucid, deep-orange residue, which re-dissolves rapidly in cold water, and possesses the peculiar sweet taste of licorice. The employment of potash or soda is, however, attended by several disadvantages, especially, when added in excess, that of altering the glycyrrhizin and communicating to it a kind of soapy taste.

Glycyrrhizin does not exist naturally in licorice root as a sodic or potassic compound. The saccharine matter contained naturally in the root is the result of a compound of glycyrrhizin with ammonia. This may be demonstrated by washing some previously-bruised licorice root, either fresh or dry, in a concentrated solution of potash or soda, when there is immediately developed a rather strong ammoniacal odor. The same reaction takes place with a pure extract obtained by exhausting the root in cold water and evaporating in a water-bath.

Glycyrrhizin forms with ammonia two compounds, one with excess of alkali, which yields a deep-yellow solution, the other containing half the proportion of the alkali and giving an amber solution. The first compound is obtained by employing an excess of ammonia to dissolve the glycyrrhizin in water. The resulting deep-yellow solution evaporated to dryness, either at the ordinary temperature or in a boiling-water bath, leaves a shining, scaly, friable, non-hygroscopic residue, which is of a yellowish color and constitutes the second ammoniacal compound; it re-dissolves readily in water, communicating to it an amber color. The addition of a few drops of ammonia immediately turns the color of this solution a deep-yellow. The aqueous solution of the second ammoniacal compound reproduces very exactly the characteristic taste of licorice root.

The author states that glycyrrhizin in these two compounds plays the part of a true acid, and that the compounds are true salts, which undergo double decomposition, not only with nearly all the metallic salts, but also with the salts of the organic alkaloids. The precipitates formed contain glycyrrhizin in combination with the oxide or the alkaloid. Glycyrrhizin, or glycyrrhizic acid, appears to be an acid intermediate in its principal properties between tannic acid and pectic acid. The yellow combination formed by excess of ammonia is the basic

glycyrrhizate of ammonia. The second, containing less ammonia, and which the author considers to represent the true sweet principle of licorice root, is the glycyrrhizate of ammonia, or, as he proposes to call it, ammoniacal glycyrrhizin. 2·50 grams of ammoniacal glycyrrhizin were dissolved in a mixture of alcohol and ether previously acidulated by some drops of hydrochloric acid, and platinum perchloride added in slight excess. The chloroplatinate of ammonia collected at the end of forty-eight hours, washed and dried, weighed 0·0455 gram. Calcined, it yielded 0·0205 of platinum, corresponding to 0·0035 of ammonia. Consequently ammoniacal glycyrrhizin contains 0·14 per cent. of ammonia, and the equivalent of glycyrrhizin would be higher than it has been hitherto considered.

In order to obtain the ammoniacal glycyrrhizin in a very pure state, the author prepares it as follows: A sample of licorice root is chosen as sweet and well preserved as possible, all the portions presenting a dark fracture are eliminated, and only those presenting a homogeneous yellow fracture are used. These are scraped superficially, and then well pounded so as to reduce them to a kind of stringy tow. This substance is macerated in cold distilled water for some hours, pressed and treated a second time in the same manner. The two liquors are mixed and allowed to stand some time to deposit the starch. The supernatant liquor is then boiled, and filtered to separate the coagulated albumen. After cooling, sulphuric acid, diluted with its weight of water, is added gradually, with brisk stirring, until a precipitate is no longer formed. The precipitate, at first gelatinous and flocculent, after standing some time forms a compact semi-solid mass at the bottom of the vessel. The supernatant liquor is rejected, and after roughly washing the precipitate several times with pure water, it is finally kneaded repeatedly in distilled water until all trace of acidity has disappeared. The mass is then well drained, and agitated in a flask with three times its weight of 90° alcohol until dissolved, when a similar quantity of 96° to 98° alcohol is added to the syrupy liquid so produced. A little pectic acid is thus precipitated, which is removed by filtration. Ether is then added to the alcoholic liquor as long as a precipitate is formed. After standing twenty-four or forty-eight hours a blackish pitchy substance is deposited, which adheres to the glass and allows of the clear liquor being decanted. To this clear liquor is added, a small quantity at a time, 90° alcohol charged with gaseous ammonia, which determines the formation of a yellow, rather heavy, flocculent precipitate of

glycyrrhizate of ammonia. This precipitate is washed rapidly on a fine cloth with a mixture of equal parts of alcohol and ether, pressed and dried in a current of warm air or over sulphuric acid. The ammoniacal glycyrrhizin so obtained, which the author considers to represent the true sweet principle of licorice root, is of a yellowish tint, very light, and entirely and rapidly soluble in water, to which it communicates an amber color and an extremely sweet taste. It can be rendered more dense by re-dissolving it in a small quantity of water, and evaporating the solution on a plate or on a glass. It is thus obtained in very brittle, translucent, shining scales, which are readily detached. In either form pure ammoniacal glycyrrhizin is unalterable in the air, non-hygroscopic, and dissolves nearly instantaneously in cold water, forming a pale amber solution, having an intensely sweet taste. The solution froths upon agitation.

One gram of pure ammoniacal glycyrrhizin dissolved in a litre of water gives a solution which is very sweet. The same quantity dissolved in two litres of water gives a solution that is more agreeable to the taste and resembles closely that of the licorice root. If a very small portion of ammoniacal glycyrrhizin be placed upon the tongue it develops instantaneously a sweet taste, so strong as to be disagreeable to most persons.

That glycyrrhizin itself is nearly insoluble in water and insipid, and only acquires its sweet taste when in combination with an alkali, may be shown by taking a solution of 1 part of ammoniacal glycyrrhizin in 300 of water, which would be a very sweet liquor, and adding to it sufficient of any acid to saturate the ammonia, and set free the glycyrrhizin. The liquor immediately loses its sweet taste, and after a time flocks of glycyrrhizin are precipitated. With more concentrated solutions (1 in 100 or 1 in 50), and acetic acid, the precipitate forms more slowly as a firm transparent jelly. This jelly has no taste, but if there has been no excess of acid used a slight taste of licorice is gradually developed in the mouth, due to the natural alkalinity of the saliva. A small quantity of ammonia re-dissolves the flocks and restores instantaneously the primitive taste.

The author considers that these facts explain simply several phenomena that have hitherto been obscure. Frequently licorice is met with that has but little taste, especially when the drying of the root has been slow or incomplete, or when it has been kept in a damp place. The result he attributes to a commencement of fermentation by which acid

products, and especially acetic acid, are generated. This ammonia of the ammoniacal glycyrrhizin is partially saturated, the insoluble glycyrrhizin being set free, and the sapidity of the root proportionately diminished. If these roots be allowed to remain a sufficient time in a slightly ammoniacal atmosphere, they recover their original taste and readily yield their sweet principle to water.

Those who have had occasion to prepare large quantities of extract of licorice by exhausting the coarsely-powdered root, will have remarked that the liquor although limpid when first obtained, frequently becomes turbid in the course of a few hours, especially in summer, giving off carbonic acid, and depositing a voluminous, gelatinous, yellow precipitate. The liquor becomes strongly acid, and loses the greater proportion of its sweet taste. The precipitate so formed, which is frequently separated and thrown away, is really the glycyrrhizin set free; it can be redissolved and the sweet taste restored to the liquor by the addition of a few drops of ammonia.

The extract obtained by evaporating the macerate of the licorice root is very hygroscopic, and frequently can only be preserved in the solid form by being mixed with large quantities of inert substances: starch, gum, etc. In the heat of summer the cylinders of extracts will soften and run in spite of all precautions. Ammoniacal glycyrrhizin, on the other hand, has no hygroscopic tendency, and does not soften even at a temperature of 80° to 100°. It is therefore to foreign matters that the softening of the extract is to be attributed.

The author has found that sulphate of quinia, sulphate of magnesium, iodide of potassium, and ipecacuanha, lose most of their taste if mixed with a sufficiency of ammoniacal glycyrrhizin. It would appear that besides the chemical reaction the very persistent taste of the sugar of licorice root renders the palate for some moments insensible or indifferent to other sensations. He considers that ammoniacal glycyrrhizin might frequently be advantageously mixed with pill masses, powders or mixtures, it being more efficacious in masking the taste than one hundred times its weight of sugar. The taking of such medicines as cod-liver oil and syrup of iodide of iron would be much facilitated by previously dissolving a very small quantity of it in the mouth.

Ammoniacal glycyrrhizin may be prepared industrially, without treatment by alcohol and ether. The bruised licorice root is exhausted methodically by the smallest possible quantity of cold water, the liquor boiled and cleared from coagulated albumen, then precipitated after

cooling by an excess of sulphuric or hydrochloric acid. The precipitate is collected and well washed, and then redissolved in ammonia water. This solution filtered and evaporated yields the ammoniacal glycyrrhizin in a friable varnish-like residue. Its taste resembles exactly the taste of the licorice root, as by this treatment the acrid matter naturally present in the root is preserved, whilst it is almost entirely removed by treatment with alcohol and ether.—*Pharm. Journ. and Trans.* [Lond.], July 17, 1875.

THE ADMINISTRATION OF PHOSPHORUS.*

BY C. MEHU.

The author states that during the past ten years his attention has been devoted to the different modes of administering phosphorus. The problem he has striven to resolve has been the obtaining of pharmaceutical preparations having a constant richness in phosphorus, and capable of indefinite preservation. In the present paper he passes in review the numerous methods which, during the past few years, have been suggested in France, England and the United States, for the administration of free phosphorus, and as the result of his earlier researches upon the subject have been adopted as the basis of the phosphorated oil of the "British Pharmacopœia," the opinions of so competent a critic will, without doubt, be of interest to the readers of this Journal.

The first preparation referred to is the phosphoretted resin, containing 4 per cent. of phosphorus, proposed by Mr. Gerrard † at an evening meeting of the Pharmaceutical Society of Great Britain. The preparation of this resin Dr. Méhu considers to be extremely dangerous, and nearly impracticable in the vessels usually available in a pharmacy, it being necessary to agitate during some time a vessel heated to 200° C., containing phosphorus and resin in a state of fusion. He states, also, that during the operation a portion of the phosphorus passes into the amorphous insoluble state. Dr. Méhu is of opinion, moreover, that phosphoretted resin is unsuited to most pharmaceutical uses for the following reasons: The resin is supersaturated with phosphorus at a high temperature, and in cooling the active element separates into solid fragments—fine they may be, but still solid. It being necessary to

* Abstract of a paper in the "Répertoire de Pharmacie," vol. iii, p. 321.

† "Pharm. Journ." [3], vol. iv, p. 441. "Amer. Pharm. Journ.," 1874, p. 23.

pulverize the resin before it can be used, the air oxidizes this divided phosphorus much more easily in the time taken up by this operation than in the few moments phosphorated oil is exposed whilst being added to a mixture. The direct pulverization of ordinary phosphorus for incorporation with a pill mass is not more defective, and gives as good results. Moreover, phosphoretted resin has been observed by Dr. Pile * to become red under the influence of light; this is what might have been expected, by reason of the incomplete solution of the phosphorus. The preparations of phosphorus, which are solid at ordinary temperatures, appear all to have a similar tendency. When made into an emulsion, phosphoretted resin rapidly deposits at the bottom of the bottle, and the deposit becomes red; the preparation, in consequence of the great density of the phosphorus (= 1·8), cannot long preserve its homogeneity. Submitted to the action of alcohol, phosphoretted resin abandons nearly all its phosphorus as a fine powder; scarcely anything but the resin dissolving, unless the proportion of alcohol be very considerable.

Dr. Méhu considers that for similar reasons the use of solid phosphorus ought to be proscribed from pharmacy. A vigorous shaking of a mixture containing solid phosphorus well divided can only diminish the dangerous inconveniences attending its use, but never totally remove them. Non-saturated solutions, in his opinion, alone present the phosphorus in an extreme state of division, and allow of a certain and regular administration. It should also be remembered that phosphorus does not fuse below 44·2° C., that is, at a temperature above that of the human body, and that only as much can be absorbed as is dissolved. The experiments of the Réveil and Personne have proved that large pieces of phosphorus can be swallowed with impunity by dogs.

To avoid the inconvenience in preparing phosphoretted resin, Mr. Abraham † has proposed to substitute balsam of tolu for the resin. But as this preparation is no more soluble in the stomach or fusible at the temperature of the human body than Mr. Gerrard's, Dr. Méhu does not consider it presents any marked practical advantage over phosphoretted resin.

Phosphoretted wax, melting at about 68° C., is, in Dr. Méhu's opinion, not more advantageous; since, although it is more easily made

* "Amer. Journ. Pharm.," 1874, p. 193.

† "Pharm. Journ." [3], vol. iv, p. 549. "Amer. Journ. Pharm.," 1874, p. 115.

into pills than the preceding preparations, these pills pass through the digestive organs without modification or sensible loss of weight.

With respect to the use of amorphous phosphorus, as suggested by Mr. Postans † the author remarks that the action of amorphous, *free from all trace of crystallizable phosphorus*, is much disputed. If it were not excluded through inertness, red phosphorus could be manipulated in the pilular form as well as any other powder upon which the air exercises no sensible action.

Mr. J. Williams has proposed the use of a solution of twelve grains of phosphorus in nine fluidounces of glycerin and nine fluidounces of alcohol; ‡ the solution would consequently contain one-twelfth of a grain of phosphorus to the fluidrachm. By dissolving the phosphorus in the glycerin, moderately heated, and then adding the alcohol heated to the same temperature, Mr. Williams obtains a solution which is free from the strong acidity always present in an alcoholic solution necessarily prepared at a much higher temperature, and due to the conversion of the phosphorus into oxygen compounds. But Dr. Méhu points out that as, according to Mr. William's own admission, this solution of phosphorus in alcohol and glycerin deposits after a time a part of its phosphorus, it has the fault common to all supersaturated solutions, such as the 2 per cent. phosphorated oil of the Codex, namely, that it cannot be kept of uniform strength, its richness in phosphorus varying with time and temperature. The alcohol has a tendency to evaporate and the glycerin to absorb atmospheric moisture, and these two effects hasten the precipitation of the phosphorus. Further, the addition of this solution to an aqueous liquid causes the immediate precipitation of the solid phosphorus.

Referring to Mr. William's plan of estimating the phosphorus in solution by means of a solution of bichloride of mercury, Dr. Méhu remarks that the property possessed by phosphorus of converting this salt into protochloride of mercury, is also enjoyed by hypophosphorous acid and other oxidized products of phosphorus.

The author states that Dr. Routh has proposed phosphoretted spermaceti as a preparation suitable for the administration of phosphorus, but without publishing any experience to justify his recommendation. Dr. Méhu finds that it is easy to dissolve in spermaceti, melted at about

† "Pharm. Journ." [3], vol. v, p. 363. "Amer. Journ. Pharm.," 1874, p. 586.

‡ "Pharm. Journ." [3], vol. v, p. 210. See also "Amer. Journ. Pharm.," 1874, p. 150 and 308.

70° C., 2 per cent. of its weight of phosphorus, and that the solution agitated during cooling in a hermetically-closed flask forms a fairly homogeneous preparation; but it reddens with extreme facility when exposed to the action even of diffused light. During the winter months the effect is very perceptible after a few hours. Even when containing only 1 per cent. of phosphorus, phosphoretted spermaceti is rapidly colored by light. Moreover, this preparation has the disadvantage of other solid preparations, that it is necessary to pulverize it before it is used; neither does it melt at the temperature of the body. The author, therefore, considers that it presents no advantages over the resin and other solid preparations.

Dr. Routh has also indicated neat's-foot oil as a good solvent of phosphorus,* but he has omitted to specify its particular advantages, probably, Dr. Méhu thinks, because he is not acquainted with any. But Dr. Méhu states that in his experiments he has found that animal oil gives only mediocre results. Further, commercial neat's-foot oil is so variable a product that it cannot prudently be used for a preparation the constant composition of which is indispensable.

In the preparation of phosphorated cod-liver oil, Dr. Méhu does not recommend the direct solution of the phosphorus in the cod-liver oil by the aid of heat; but that a sufficient quantity of oil of almonds, containing 1 per cent. of phosphorus, be added to the cod-liver oil to bring it up to the richness in phosphorus required.

Phosphorated ether is open to the serious objection that by its rapid volatilization free solid phosphorus is deposited. Further, whilst it is difficult to obtain ether free from water and alcohol, its solvent power with respect to phosphorus will vary with the proportions of each of those bodies present. On the other hand, phosphorated ether will not mix with water; introduced into an emulsion or draught it quickly deposits solid phosphorus, and a similar deposit of solid phosphorus is to be feared when phosphorated ether is introduced into the stomach in capsules.

With respect to the so-called solution of chlorophosphide of arsenic, obtained by allowing the hydrochloric acid to react upon phosphorus and arsenic in a fine state of division,† Dr. Méhu says that such a mixture is neither a solution of free phosphorus nor of chlorophosphide of arsenic, but a hydrochloric solution of variable composition, con-

* "Pharm. Journ." [3], vol. iv, p. 965. "Amer. Journ. Pharm.," 1874, p. 337.
† "Pharm. Journ." [3], vol. iv, p. 965. *Ibid.* p. 338.

taining oxygen products of arsenic and phosphorus. This preparation is, in his opinion, unworthy of any attention.

Phosphide of zinc, Dr. Méhu thinks, cannot be considered as a medicament presenting free phosphorus to the system.

Dr. Méhu shares the opinion of Mr. Martindale,‡ that the previous heating of oil of almonds to 300° F. is not a precaution absolutely necessary in the preparation of phosphorated oil of good quality; but he adds that his recommendation of this preliminary heating had for its object the rendering of the preparation unalterable by light. That it has this effect he has proved by the preservation of flasks of oil containing 1 per cent. of phosphorus, exposed to the light during seven years, without manifesting the slightest turbidity or depositing a trace of red phosphorus. At the Pharmaceutical Congress in St. Petersburg he exhibited, for comparison, phosphorated oil unaltered which had been prepared six years with previously-heated oil of almonds, and some prepared with the same kind of oil not previously heated. The phosphorus in the latter was almost entirely precipitated in the state of red phosphorus, although the solution, like the former, had been kept in a vessel sealed at the lamp.

Mr. Ashburton Thompson stated* that the phosphorated oil is an unsatisfactory preparation, because when exposed to the air the phosphorus which it contains readily oxidizes. Dr. Méhu points out that this oxidation, which is common to all preparations containing free phosphorus, may be prevented by the addition of a few drops of ether. The same result may be attained by the use of a small quantity of oil of turpentine, but such an addition may be objectionable, since oil of turpentine acts as an antidote to phosphorus. Dr. Méhu states that he has kept phosphorated oil to which a very small quantity of ether has been added, for months, in bottles opened every day, without the oil undergoing any sensible alteration.

Dr. Méhu supplements his criticisms by some details as to what he has found to be the best mode of preparing phosphorated oil. Pure oil of sweet almonds, slightly colored, limpid, free from admixture with oil from plum and peach kernels, sometimes present in commercial oil, is the oil he prefers to use. This oil is heated in a porcelain capsule. At a temperature near 150° C. it is very perceptibly decolorized, and this decoloration is more marked as the temperature rises, but

‡ "Pharm. Journ." [3], vol. iv, p. 902.
* "Pharm. Journ." [3], vol. iv, p. 965.

it is not entirely persistent after cooling. The decoloration is a sign of the good quality of the oil; for the red-tinted oils, extracted from the seeds of various species of *Rosaceæ*, are very slightly decolorized. The color is injurious to the appearance of the product, although not to the solvent or keeping properties of the oil. The oil after being raised to a temperature of from 200° to 250° C., is left to cool partially, and then filtered, still hot, through paper. The vessel into which it is received should be scrupulously dry and clean. This oil will dissolve about one-eightieth of its weight of phosphorus, but it is recommended not to dissolve more than 1 per cent., so as to avoid all danger of supersaturation. A ground-stoppered flask is then filled to nine-tenths of its capacity with the oil, and 1 per cent. of its weight of phosphorus added.

The phosphorus, cut under water and weighed after drying with a fine linen cloth, should be perfectly transparent and free from either red or white phosphorus. The flask is placed up to the neck in a boiling-water bath; and when sufficiently heated it is closed, and after the temperature has risen to about 70° or 80° C. the bottle is well agitated until the solution of the phosphorus is complete. Dr. Méhu does not operate upon more than a kilogram of oil at a time, so that the agitation may not be too difficult. When the flask has cooled, if it be opened in the dark, the oil presents a beautiful phosphorescence and emits luminous vapors. A few drops of ether poured upon the stopper at the moment of opening the bottle suffices to prevent this oxidation and the phosphorescence.

Most fixed oils dissolve nearly one-eightieth of their weight of phosphorus; castor oil, however, dissolves only one part in one hundred and twenty at ordinary temperature. Experiment has shown that with arsenious acid the results are different, castor oil dissolving three parts in a thousand, whilst oil of almonds dissolves scarcely one part. Dr. Méhu's experiments have shown also that the essential oils which contain no oxygen, alone prevent the phosphorescence of phosphorated oil; oxygenated essential oils do not possess that power.

The pharmaceutical form which, in Dr. Méhu's opinion, lends itself best to the continued administration of phosphorated oil is that of capsules containing one milligram. He also gives the following formula for an emulsion:

Phosphorated Oil (1 per cent.),	0·10 gram.
Syrup of Gum,	30·00 "
Distilled Peppermint Water,	30·00 "

Pour the thirty grams of syrup of gum into a bottle of 60 grams capacity, and by slightly shaking cause it to moisten the entire interior of the bottle. Introduce the phosphorated oil (as many decigrams as the emulsion should contain milligrams of phosphorus), shake well and pour in the peppermint water. The bottle should be shaken, before administering a dose, to render the emulsion perfectly homogeneous.—*Pharm. Journ. and Trans.* [Lond.], July 3, 1875.

NOTES ON THE THEORETICAL VIEWS OF THE CONSTITUTION OF BLEACHING POWDER.

BY DR. LUNGE.

The oldest formula proposed for bleaching powder seems to have been CaOCl (according to the old notation), but in 1835 Balard ("Annales de Chimie et de Physique" (2) lvii, p. 225) after having studied the properties of sodium hypochlorite, came to the conclusion that the constitution of "chloride of lime" was a similar one, and, doubting the above formula, distributed it as an equivalent of calcium hypochlorite, and an equivalent of calcium chloride: $CaOClO+CaCl$ (or $CaCl_2O_2+CaCl_2$, new notation), mixed with an excess of CaOHO. The celebrated Gay Lussac, in 1842, gave further reasons for this theory ("Annales de Chemie et de Physique" (3) v, p. 273), and it has remained the dominant one up to this day, and is generally to be found in the ordinary chemical text-books. In 1861, Fresenius published ("Liebig's Annalen," vol. cxviii, p. 217) researches upon this subject, the result of which led him to the formula $CaOClO+CaCl$, $2CaO+4Aq$. But this formula seems quite untenable, despite the high authority of its proposer and the minuteness of his researches, inasmuch as it only allows of a strength of 32 per cent. available chlorine, whilst it is well known that 39 per cent. can be easily obtained. Besides, Bolley has shown that the compound $CaCl,2CaO$ is itself decomposable by chlorine into CaOCl, and there seems to be no reason why the action of chlorine should stop short of this in the ordinary manufacture of bleaching powder. Less material is the objection raised by Odling (in his "Manual of Chemistry") that the above formula cannot be correct, because alcohol does not dissolve calcium chloride from bleaching powder, and because the latter does not deliquesce, for both the one and the other fact are disputed by most other observers. Odling's own formula is: $Ca\{^{ClO}_{Cl}+H_2O$. During the

last few years several valuable papers have been published by chemists who combine practical knowledge of the manufacture of bleaching powder with that of scientific chemistry, and they nearly all seem to agree that, whilst the product of the action of water upon bleaching powder, as well as the so-called "bleach liquor," contains a mixture of calcium hypochlorite and calcium chloride, yet in the *dry* bleaching powder the calcium hypochlorite does not seem to exist. I do not here take into account the paper ("Comptes Rendus," vol. lxxiv, p. 1411) published by Grace Calvert in 1872 (giving the formula $CaOClO+2CaCl$), because Kolb has shown his analytical method to be entirely fallacious, and even theoretically, Calvert seems to have made a grave omission, since $3CaO$ and $3Cl$ (old equivalents) do not exactly give $CaOClO+2CaCl$, but leaves an O to spare, which is not in any way accounted for.

Kolb (in the "Bulletin de la Société Chimique" for 1868, ix, p. 82) showed that *dry* carbonic acid acts upon *dry* bleaching powder in such a manner that, besides calcium carbonate, only free chlorine, and no hypochlorous acid, is generated; he, therefore, rejected the formula of Balard, and returned to $CaOCl$ ($CaOCl_2$, new equivalents), his exact formula being $2(CaOClHO)+CaOHO$. In damp air, however, bleaching powder yielded to him hypochlorous acid. Bobierre (*Ibidem*, p. 172), and Scheurer-Kestner (*Ibidem*, p. 159), did not contradict Kolb upon this point, but they showed, in opposition to him, that if the temperature be raised too much, chlorine acts upon calcium hydrate so as partly to set free the water of hydration, and they both show (what is known to all practical men) that if a great excess of chlorine acts upon strong bleaching powder the *available* chlorine in the product is actually reduced. In 1873, Goepner published a long memoir on bleaching powder ("Dingler's Journal," vol. ccxxxix, p. 204). He showed that the well-known fact of calcium chloride being always present in bleaching powder over and above that demanded by the formula $CaOClO+CaCl$, is caused by the presence of calcium carbonate in the lime employed for absorption, either from imperfect burning, or recarbonation of the same, or from carbonates present in the manganese, the action of chlorine upon calcium carbonate being represented by the equation: $CaOCO_2+2Cl=ClO+CaCl+CO_2$. In his opinion this calcium chloride forms a wall which protects a portion of the calcium hydrate from the action of chlorine, and thus he explains the long-established fact that there is always a quantity of calcium hydrate pres-

ent in bleaching powder, but he denies any chemical combination of it with CaOCl. He strongly objects to considering the latter as composed according to Balard's theory, his principal argument being that on distillation with strong acids it does not yield hypochlorous acid, but only free chlorine. Goepner distinguishes the one from the other by shaking the distillate with mercury, which with Cl gives a white precipitate, but with ClO a brown precipitate. The latter Goepner professes never to have obtained, but he is contradicted upon this point by Schorlemmer, who, however, leaves untouched the argument which Goepner shares with Kolb, viz., that CO_2 never evolves from dry bleaching powder anything but Cl. Goepner further maintains that the peculiar smell of bleaching powder is in reality only that of very diluted chlorine, and that it can be exactly imitated by letting a drop of chlorine water fall into a half-gallon bottle full of air.

The newest paper upon this subject (just published) is by Richters and Juncker ("Dingler's Journal," vol. ccxi, p. 31). Whilst contradicting both Kolb and Goepner on several points, they come to the same conclusion as to the constitution of bleaching powder, viz., that the assumption of the existence of calcium hypochlorite in dry bleaching powder is untenable, and that there must be a ternary compound CaOCl (or $CaOCl_2$, new notation), about whose internal constitution nothing is at yet known. R. and J. maintain that CO_2 has no perceptible action at all upon *dry* bleaching powder, and that from *damp* bleach it evolves both Cl, and ClO. They also found that according to the mode of manipulation the action of strong acids upon bleach will either yield only Cl, or only ClO, or both, but the question can be better approached by using phosphoric acid, which does not act upon calcium chloride, and yet evolves from bleach (upon distillation) only chlorine. They reject mercury as a reagent for the distinction between chlorine and hypochlorous acid, as leading too easily to wrong conclusions; instead of this they proceed by titrating 20 c.c. of the distillate with arsenious acid, and another 20 c.c. with silver nitrate, after neutralizing it with ammonia and evaporating to dryness. They give the following equations:

$$ClO+AsO_3+HO=AsO_5+HCl.$$
$$2Cl+AsO_3+2HO=AsO_5+2HCl.$$

The same amount of arsenious acid, therefore, corresponds to one HCl, and one $AgONO_5$ for hypochlorous acid, but to 2HCl and two $AgONO_5$ for free chlorine, and in fact it is found that the distillate

corresponds with the latter assumption only. Another experiment seems to them even more decisive against Balard's theory, viz., that one gram bleaching powder, boiled with a solution of phosphoric acid and precipitated with argentic nitrate, only shows 2·99 per cent. CaCl. On the other hand, their experiments again show that a *solution* of bleaching powder behaves like a mixture of calcium hypochlorite and calcium chloride. Last of all, R. and J. controvert Goepner's idea that the constant presence of free calcium hydrate in bleach is attributable to its being protected by calcium chloride, but they seek the explanation of the above in the fact, first established by Graham, that perfectly dry calcium hydrate is not acted upon by chlorine, and they show that it is indifferent whether the calcium hydrate is deprived of its moisture by heat, or by the presence of other bodies having a greater attraction for water, such as calcium chloride, or even the bleaching compound CaOCl, whose hygroscopic properties are well known.—*Amer. Chem.*, June, 1875, from *Trans. Newcastle-upon-Tyne Chem. Soc.*

REPORT ON THE DEVELOPMENT OF THE CHEMICAL ARTS DURING THE LAST TEN YEARS.*

BY DR. A. W. HOFMANN.

(Continued from page 369.)

The air is driven, by means of a blast, at a pressure of 3 to 4 c. m. of mercury, through a sheet-iron box filled with caustic lime, and then conducted into the retort from above. The temperature of the latter can be judged by means of an aperture, which can be closed with an iron stopper. The air gives off only about the half of its oxygen, so that, for 1 volume of oxygen 10 volumes of air must be passed through, the residue escaping into the atmosphere.† In about five minutes the revivification of the reduced mass is completed, when the stream of air is cut off by means of a cock with a triple perforation, and a current of superheated steam is passed through for five minutes, whilst immediately afterwards the gas which issues below the grate is conducted into condensers. Here, a fine descending rain of cold water frees the oxygen from steam, and it enters the gasometer under the pressure of a column of water

* "Berichte über die Entwickelung der Chemischen Industrie Während des Letzten Jahrzehends."

† Latterly, Tessié du Motay has attempted to convert the escaping nitrogen industrially, first into nitride of titanium, and then into ammonia.

of from 8 to 10 c. m. in height. In this manner reduction and oxidation alternate at intervals of five minutes. Not until six hours have elapsed does it become necessary for a more complete revivification of the mass to pass atmospheric air over it for an hour, for in five to six hours the yield of oxygen sinks from its original quantity down to the half, or even the third. The cocks are set at Vienna by a self-acting movement. The longer watery vapor is introduced, and the retorts thus freed from atmospheric air before opening the communication with the gasometer, the purer is the oxygen. Half a minute suffices to bring down the nitrogen to 15 per cent. if the useless space in the retorts is kept as small as possible. If, as is easily practicable, the nitrogen is brought down to 4 per cent., there is a greater waste of oxygen. To be certain that the amount of nitrogen remains within the limits of from 10 to 15 per cent., samples are taken from the gasometer in graduated tubes, and the oxygen is absorbed by means of known quantities of potash and pyrogallic acid, a reaction which, even in inexperienced hands, gives quick and accurate results.

As any cooling of the retorts below a dark-red heat diminishes the yield, care is taken to heat both the air and steam to about 300° C. At Pantin, where there are several groups of ten retorts each, two of them are filled with pumice-stone, and serve for heating the air and the steam. The composition of the mass is 2 molecules of NaOH, 1 molecule of MnO_2, and the fifth of a molecule of oxide of copper, which merely serves to separate the other ingredients and render them more accessible to the influence of steam and air. At Comines, the black oxide of manganese is regenerated in the ordinary manner from chlorine residues, and is almost pure; its price is 2 francs per kilo. The great cost of this fundamental article is not of importance, since it can be used the longer the more carefully the air is freed from carbonic acid. If, in consequence of some inevitable interruption of the process, the mass absorbs atmospheric carbonic acid, it is simply requisite to heat to redness, and to pass a current of steam over it till the escaping vapors cease to render lime-water turbid. The temperature is then raised and air passed over the mass, when it regains its original efficacy. The average duration of a retort is one year.

Tessié du Motay's process yields oxygen at 90 per cent., at the cost of 15 to 30 centimes per cubic metre,* or, according to the experiments of Kuppelwieser in Vienna,† 3 florins per 1,000 cubic feet, a price

* Phillip's "Der Sauerstoff," 18.

† Kuppelwieser, "Berg. und Hütten Ztg.," 1873, 354.

which agrees with the former, and which scarcely exceeds that of coal-gas. We may regard this process as the final and successful solution of the problem as to the economical and rational production of oxygen.

We have still to review a group of projects which, without any chemical agents, aim at extracting oxygen from the atmosphere by a purely mechanical procedure. They are based upon two physical principles, diffusion or absorption.

Th. Graham who, in his classical researches, investigated the laws of the escape of gases through narrow apertures, made known in 1866 † that air which is drawn through a fine chink in a plate of caoutchouc passes in the constant proportion of 41·6 per cent. of oxygen to 58·4 per cent. of nitrogen, the half of the atmospheric nitrogen being held back. This mixture causes glowing chips of wood to burst into flame. Deville ‡ tested the industrial value of this process, and found that the time required was too long.

Absorption has been utilized in two distinct forms. Montmagnon and De Laire, in 1868, took out a French patent, ‖ based upon the observation of Angus Smith, § that charcoal absorbs from the air more oxygen than nitrogen. According to them, 100 litres of wood-charcoal absorb 925 litres of oxygen and only 750 litres of nitrogen. If moistened with water, they give off 350 litres of oxygen and 650 litres of nitrogen, so that 575 litres of oxygen and 55 (100?) litres of nitrogen remain and can be extracted with the air-pump. By repeating this process with the same gaseous mixture, they succeeded in bringing the oxygen almost in a state of purity. Whether this process has ever been carried out on the large scale is not known. An attempt has, however, been made with Mallet's method, ¶ based on the property of water to absorb oxygen rather than nitrogen.

The coefficients of absorption of the two gases are 0·025 for N, and 0·064 for O. If multiplied by the proportion of their bulk in the atmosphere, 0·79 for N, and 0·21 for O, these numbers give the volume-proportion of both gases in water = 0·0197 N, and 0·0097 O; or, the air absorbed in water contains in one volume, 0·67 N, and 0·33 O. If the unabsorbed nitrogen is allowed to escape, and the absorbed

† Graham, "Comptes Rendus," lxiii, 471.
‡ Deville, Wagner, "Jahresberichte," 1867, 216.
‖ "Bull. de la Soc. Chim." [2], xi, 261.
§ Angus Smith, "Proc. Roy. Soc.," xii, 424.
¶ Mallet, "Dingler's Polyt. Journ.," cic, 112.

gaseous mixture, richer in oxygen, is withdrawn from the water and again absorbed, it follows, from the multiplication of the two coefficients of absorption with the volume proportions 0·67 N and 0·33 O, that the gaseous mixture now taken up has the composition 0·525 N : 0·475 O; a third absorption raises the result to 0·375 N : 0·625 O; a fourth to 0·25 N : 0·75 O; and a fifth to 0·15 N : 0·85 O, the proportion in which the two gases occur in Tessié du Motay's oxygenous mixture. After the eighth absorption, the gas is almost pure oxygen (0·973 O and 0·027 N).

Mallet's apparatus consisted of a larger or smaller number of strong iron water-holders connected with each other by means of suction- and forcing-pumps. Into the first air is driven through fine apertures at a pressure of about five atmospheres. The unabsorbed nitrogen escapes by a valve. The absorbed gas is now extracted by the second pump from the first receiver and forced into the second. With a series of four receivers the operation lasts five minutes. If the receivers serially decrease in size, the first holding 10 cubic metres and the last 5, the result of a continuous working of the process is 7760 litres per hour of a gaseous mixture containing 75 per cent. of oxygen, or 168 cubic metres in twenty-four hours. The cost of working, wear and tear, and supervision are said to be insignificant. Where motive-power is cheap, *i. e.*, water-power or the waste heat of metallurgical processes, this method may consequently be applicable, especially for use in such metallurgical operations where a mixture comparatively poor in oxygen is serviceable.

If we sum up the results of our survey of the methods for the industrial preparation of oxygen, we must place Tessié du Motay's process in the first line, as well tried and proved, and in the second Mallet's mechanical process as just described.

Finally, we pass to the question, To what applications has oxygen hitherto been put? As the supporter of combustion, we owe to it heat and light; and as the medium of respiration, it is the condition of life.

(To be continued.)

VARIETIES.

SOME OF THE PROPERTIES OF GRINDELIA ROBUSTA. By Henry M. Fiske, M.D. —The *Grindelia robusta* is an herbaceous plant, perennial, and a native of the West Coast of America, flourishing luxuriantly between the 28th and 52d degrees of

north latitude. It varies in height from a few inches to two or three feet. Usually, as found on our elevated plains and hill-sides, it is about 18 inches high. Its general characteristics resemble the common sun-flower, and in most parts the common name is wild sun-flower. Lately it has been called to the notice of the profession by J. G. Steele, a chemist of this city, as a remedy for the poison of the *Rhus toxicodendron*, and by Dr. W. P. Gibbons, as a valuable remedial agent in asthma.

In cases of poisoning by the Rhus, it has not, in my hands, verified the expectations of its introducers. It is a demulcent as well as stimulant, and makes an excellent dressing for vesicated surfaces. For burns, the fresh herb bruised and applied frequently over the injured parts, relieves the pain, soothes and calms the sufferer, and often sleep follows where formerly intense torture had existed, making in these cases a far better dressing than anything I ever used. It is one of the best remedies we have in uterine catarrh, or the catarrh of the urinary organs. In subduing the intense burning and itching of vaginitis, as well as painful priapism, it is of great value. In the first, the tincture or fluid extract, of the strength of one tablespoonful of water, should be used as an injection three or four times a day, and cloths should be soaked in it and applied to the pubes, as hot as can be borne. In the other, a direct application should be made of the bruised plant, in the form of a poultice, if possible, changed frequently. In a few hours marked beneficial results will be noticed.

But it is in iritis that its greatest victories are won, no matter much what the cause, whether gout, rheumatism, scrofula or violence. It seems, in its effects on the diseased iris, to be almost a specific, when used internally and externally.—*Pacific Med. and Surg. Journ., August*, 1875.

EUCALYPTUS GLOBULUS.—The result of extensive administration of this article in intermittent fever has hardly corroborated the promise of early experience; but it is interesting to find that its alleged influence on malaria has received some substantial confirmation. Dr. Cosson recently announced that its effect in Algeria had been very marked. Since the growth of plantations of this tree around the lake of Fezzara, the malaria which formerly was intense has almost disappeared.

The village of Ain Mokra, according to Captain Ney, furnishes an equally striking instance. The station was formerly so unhealthy that it was necessary to change the French garrison every five days on account of the number of men attacked. Fever has, however, become much more rare since plantations of *Eucalyptus globulus* have been made on the shores of the lake and the sides of the railway, which include altogether 60,000 trees. A writer in the "Temps" mentions a still more singular effect, namely, that parasites (phylloxera, etc.) disappear from vines growing near the *eucalyptus*. The experiment, made during several years and in several vineyards, had been uniform in its result.

It is interesting, in connection with these facts, to observe that the leaves of this plant contain an etherial oil, of which even half-dried leaves contain 6 per cent., and that this oil, according to Gimbert, is a very powerful antiseptic. It will preserve blood and pus as long as carbolic acid (five months and more), and far longer than oil of turpentine. It prevents also the appearance of fungi or vibrios. These observations have received independent confirmation from Binz, in Germany.—*Medical News, August*, 1875, from *The Lancet, July* 3, 1875.

CREASOTE FROM BEECHWOOD.—By A W. Hofmann.—In a former communication it was shown that the high boiling portion of creasote from beechwood contains a liquid boiling at 270°. On treating it with potassium dichromate it yielded cærolignone and a compound crystallizing in long yellow needles. The latter body is the oxidation-product of an oily liquid boiling at 285°, which was obtained pure by fractional distillation and repeated recrystallization of its sodium-salts. It has the composition $C_{11}H_{16}O_3$, and the yellow body is a quinone consisting of $C_8H_8O_4$. Reducing agents convert it into the phenol, $C_8H_{10}O_4$, crystallizing in white needles. Bromine changes the quinone into $C_8H_6Br_2O_4$, forming brilliant red crystals melting at 175°.

Liebermann's cærolignone is identical with Reichenbach's cedriret.

Liebermann (*ibid.*, 66) has also found that these bodies are identical, and explains the reasons why he formerly believed them to be different bodies.—*Jour. Chem. Soc.*, June, 1875, from *Deut. Chem. Ges. Ber.*, viii, 66—68.

PURPLE COLORING MATTER DERIVED FROM CYANOGEN. By G. Bong.—Several chemists have observed that when potassium cyanide is added to the acid solution of a copper salt, a fugitive rose-red coloration is produced. Bong finds that if an iron salt be added to the copper solution after the cyanide, a fine red permanent tint is formed, and on addition of excess of iron salt, the red coloring matter is precipitated together with prussian blue. The mixed precipitate is treated with ammonium carbonate, which dissolves copper cyanide and the new coloring matter. The ammoniacal solution is acidified, and the resulting precipitate is treated with sulphydric acid. After filtering off the copper sulphide, the filtrate is digested with lead carbonate to remove the excess of sulphydric acid. A pure purple-colored aqueous solution of the new substance is thus obtained. The coloring matter is precipitated therefrom by salts of zinc, copper, mercury or silver. The copper precipitate has the following composition: Carbon, 24·31; nitrogen, 28·04; hydrogen, 1·88; iron, 13·66; copper, 17·67; oxygen, 14·44, which approaches nearly the formula, $C_8N_8H_8O_4FeCu$. The aqueous solution of the coloring matter decomposes carbonates. The coloring matter combines with ferrocyanides. It resists the action of boiling alkalies, and of sulphurous and sulphydric acids. Concentrated sulphuric acid turns it yellow, but the original tint is restored on adding water. It is destroyed by oxidizing substances. Mordanted fabrics fix the coloring matter.—*Jour. Chem Soc.*, June, 1875, from *Compt. rend.*, lxxx, 559—561.

RECIPROCAL DISPLACEMEMT OF VOLATILE FATTY ACIDS. By H. Lescœur.—Berthelot states that formic acid will drive out all the other volatile fatty acids if the acids are present in equivalent quantities. Duclaux has, however, remarked that this displacement is not quite complete, but that an equilibrium is established. The author also finds that formates are notably decomposed by acetic acid, when the latter is in excess. When one part of dry neutral sodium formate and two parts of monohydrated acetic acid are submitted to distillation, nearly three-fourths of the formic acid present passes over. Heat is not the cause of this decomposition, since potassium formate solution spontaneously evaporated with excess of acetic acid, loses much of its formic acid. The quantity of formate decomposed varies with the excess of acetic acid, but not proportionally. Water has but little influence on he reaction.—*Jour. Chem. Soc.*, June, 1875, from *Compt. rend.*, lxxx, 563—565.

WINE WITHOUT GRAPES.—We never expected to see the manufacture of wine without the juice of the grape defended by any reputable authority; but this seems to have been done at a recent session of the International Viticultural Congress, at Montpelier. On that occasion M. Saint Pierre, a Professor in the Medical College of that city, gave some facts in regard to this fabrication of imitated wines, a branch of business which has of late rapidly developed in Hérault, especially at Cette and Mèze. The product of this manufacture is mostly exported, the bulk being sent to Russia, Denmark, Holland, England and North and South America. Cette alone makes nearly 8,000,000 gallons per annum, worth about 15,000,000 francs. Two-thirds of this is consumed in America. The only wines that can be successfully imitated are those rich in alcohol, such as the wines of Spain and Portugal. It is not true that grape-juice is the only thing omitted in the composition of these wines, as that is the cheapest ingredient. Nor is coloring matter used to any extent, as the wines to be imitated are white. The Portuguese formerly colored their wines with elder-berries, but abandoned it on finding that it injured the wine. The imitation of Spanish wines utilizes a large amount of cheap wines in the south of France, the production of which has been stimulated of late years. These wines show scarcely 11 per cent. of alcohol, but with the addition of syrup of mulberry and alcohol the strength is raised to 21 per cent. The Professor, with great frankness, pleads for the encouragement of this industry. The members of the Congress visited Cette and Mèze, and inspected several manufactories. One of the largest at Cette had then stored over 280,000 gallons in cellars containing from 80,000 to 100,000 gallons each. The total value of the whole deposit is stated at £40,000. At Mèze, one establishment astonished the visitors by the vast extent of its coopers' shops, and its steam-engines of great power, pumping the wine from great cisterns into the casks.—*Jour. Applied Science*, August 1st, 1875.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

AMERICAN PHRMACEUTICAL ASSOCIATION.—Mr. L. M. Royce, from whom the round-trip tickets between New York and Boston, by the Fall River Line, are obainable at the reduced price of $7, informs us that the steamers leave New York daily at 5 P. M. from pier No. 28, North River; the Sunday boats will, however, be discontinued after August 29th. The Ticket includes berth; but state-rooms will cost one to five dollars, according to size and location. The one dollar rooms are very good and have two bearths. State-rooms may be secured some days in advance, by writing or telegraphing to the general passenger agent, Geo. L. Connor. In the beginning of September, the tide of travel will be towards New York, and it is *possible* that there will be no difficulty in obtaining rooms on board. For the return trip, however, state-rooms should be secured in advance, as the boats are likely to be full.

At the Louisville meeting of the Association, a committee was appointed to aid the proposed Liebig memorial; the Committe has issued the following appeal:

To the Pharmacists and Druggists of the United States:

GENTLEMEN,—The American Pharmaceutical Association, in consideration and grateful acknowledg-

ment of what science in general and pharmacy in particular owe to the genius of the late Prof. Liebig, deem it a duty to make efforts to induce the members of the pharmaceutical profession throughout the country to participate, by contributions, in the noble undertaking inaugurated in Europe and this country to erect a monument to the memory of the great chemist.

The Association has, at its meeting in Louisville, Ky., appointed the undersigned a Committee to ask for and receive such contributions, and to act in conjunction with the Central Committee of the Chemists of the United States.

In appealing therefore to your generosity and willingness to give a practical expression to your respect for the memory of the great scientist, we respectfully request you to send contributions, according to means or inclination, to any one of the undersigned members of the Committee, and hope the Association will be able to present, by next spring, a very creditable token of the high esteem in which the memory of Liebig is held in the hearts of the pharmacists of the United States.

"The Committee on Liebig Memorial:"

PAUL BALLUFF, 655 Sixth avenue, New York, *Chairman.*
JOHN F. HANCOCK, Baltimore, Md.
ALB. E. EBERT, Chicago, Ill.

September 1st, 1875.

THE GERMAN APOTHECARIES' SOCIETY of New York has published a comparative table of those preparations of the German and United States Pharmacopœias, which differ materially in their composition. The table indicates the differences by giving the officinal specific gravities, the menstrua used, the strength of the alcohol, and, approximately, the percentage by weight of the most important drug contained in the preparations.

NEW YORK ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY.—At the monthly meeting, held August 3d, Mr. Wilson called attention to the effect of carbolic acid upon collodion, producing a jelly-like mass. This change is one of the "Pharmacopœia" tests for distinguishing carbolic acid from beechtar creasote; it is probably merely a mechanical action, the same effect being produced by all acids and by much of the commercial creasote.

Mr. Wellcome exhibited the following prescription:

℞.	Olei gaultheriæ,	gtt. iii
	Sol. morph. Magend.,	ʒi
	Aquæ calcis,	ʒii

M. et Sig.—A teaspoonful every two hours.

On addding the oil to the lime-water, a dense white precipitate was formed, and the odor of gaultheria entirely disappeared. Oil of gaultheria consists mainly of methyl-salicylic acid, and forms with the hydrate of calcium a precipitate of methyl-salicylate of calcium. Mr. Jungmann thought that the morphia would also be precipitated. Mr. Wood stated that he frequently had morphia prescribed with lime-water, and always put a label on the bottle directing the mixture to be shaken, which he considered a necessary precaution.

Dr. V. Weber gave a very interesting report on "The Therapeutical Effects of Jaborandi;" he considers it a valuable diaphoretic; but thinks it will not come into general use until its disagreeable properties as a sialagogue are overcome. Experiments are being made with that view. Perhaps the alkaloids just reported to have been isolated by Mr. Gerrard might prove to represent the desirable properties only.

Attention was called to reports which have appeared in the Virginia "Medical Journal" on the action of a new drug, damiana, which is recommended as an aphrodisiac; it was first introduced into this market last fall by a Washington druggist.

The tincture is put up in 8-oz. bottles, which sell for $2 each, with the directions to take from a dessert to a tablespoonful, *when ordered by* a *physician.* It has been prescribed by several leading physicians of New York, but, thus far, no authentic reports of its action have been received. Several have tried to obtain samples of the drug, but failed. If it is really a valuable drug, why is it not brought into the market, so that its origin and properties may be investigated? Thus far its introduction has given it the semblance of a nostrum.

The next meeting will be held Tuesday evening, September 7th, when Prof. J. Suckert, Ph. G., will deliver a lecture on "The Coal-Tar Colors."

INDIANAPOLIS PHARMACEUTICAL ASSOCIATION.—The annual election took place at the meeting held August 10th, and resulted as follows: President, George W. Sloan; Vice-Presidents, E. A. Cobb and J. B. Dill; Recording-Secretary, John Hageny; Corresponding Secretary, C. B. Griffith; Treasurer, J. I. Tibbetts; Executive Committee, Messrs. Hillman, Martin and Cobb. Committees on the Library, on the Cabinet and on subjects for discussion, were appointed; also, the following delegates and alternates to the next meeting of the American Pharmaceutical Association: E. Lilly, J. Hageny, W. J. Brown, H. B. Cole, F. H. Carter, J. I. Tibbetts, G. W. Sloan, J. B. Dill, G. T. Moore and C. B. Matlock. A vote of thanks was tendered to Messrs. Powers & Weightman for an elegant collection of chemicals donated to the Cabinet. Citrate of Magnesium will be the subject for discussion at the next meeting.

PHARMACEUTICAL ASSOCIATION OF QUEBEC.—The new Council has elected the following officers: Henry R. Gray, President; Edmund Giroux and Alex. Manson, Vice-Presidents; James Goulden, Treasurer, and E. Muir, Secretary and Registrar. The College of Pharmacy has been organized with the following faculty: J. Baker Edwards, Ph. D., Professor of Chemistry; A. H. Kollmeyer, M.D., Professor of Materia Medica and Toxicology, and J. B. McConnell, M.D., Professor of Botany.

PHARMACEUTICAL SOCIETIES IN EUROPE.—The following National Associations have held their annual meetings: Denmark, July 5th and 6th, at Vejle; Switzerland, August 11th and 12th, at Berne; Great Britain (British Pharmaceutical Conference), August 23d and 24th, at Bristol. The annual meeting of the German Apothecaries' Society will occur simultaneously with that of the American Pharmaceutical Association, commencing at Hamburg, September 6th, and will probably adjourn September 9th, and the Austrian Pharmaceutical Association will meet at Vienna, September 7th.

PHARMACEUTICAL SOCIETY OF PARIS.—M. Planchon presided at the meeting held May 5th. A note by M. Vidau, "On the action of monosulphide of sodium upon nitrate of silver," was read. The author states that if sodium sulphide is added to an aqueous solution of nitrate of silver, all the silver has been precipitated as soon as nitroprusside of sodium indicates the presence of dissolved sulphide by the characteristic violet coloration. But if the nitrate of silver had been previously dissolved in a solution of potassium cyanide, a much larger quantity of the sodium sulphide is necessary for the complete precipitation of the silver, and the liquid indicates the

presence of dissolved sulphide by the reaction with nitroprusside, while, at the same time, silver remains in solution and is precipitated on the further addition of sodium sulphide.

M. Balland stated in a note, that he had observed upon old Roman copper coins found near Cherchell, the formation of malachit and ziguelin (cuprous oxide), the simultaneous production of the two compounds being of interest.

M. Limousin exhibited some *sugar-potions* (*sucres-tisanes*) intended for the extemporaneous preparation of draughts. They appear to be saccharated extracts, obtained by evaporating the infusion or decoction with sugar. Similar preparations have been used in Paris for a long time, and were proposed many years ago (*see* "Amer. Journ. Pharm.," 1853, p. 271).

At the session held June 2d, M. Polacci presented a paper describing experiments, whereby it was proven that flowers of sulphur, when moistened with distilled water and exposed to the air, slowly form sulphuric acid at a low temperature, more rapidly at a temperature of 35° to 40° C. (95° to 104° F.), and in much shorter time at 65° to 70° C. (149 to 158° F.).

M. Roussin read a paper "On the saccharine principle of licorice root and an ammoniacal compound of glycyrrhizin" (*see* page 405). M. Baudrimont had often noticed that syrup of citric acid added to a mixture sweetened by licorice, deprived it of its sweet taste. M. Bussy said that, as a consequence of these observations, licorice was not adapted for sweetening mixtures containing alkaloids in solution. In answer to a question by M. Dubail, M. Roussin stated that glycyrrhizin forms compounds with potassa and soda, but the ammonia compound is preferable because an excess of the base and a disagreeable taste of the product is then avoided. M. Mialhe stated that the saliva of diabetic patients was unusually acid, and that this explains the reason why they do not perceive the taste of licorice. On prolonged mastication, however, the saliva becomes alkaline.

M. Baudrimont read a paper "On the preparation of *crystallized monosulphide of sodium*," stating that when sulphuretted hydrogen is passed into solution of caustic soda of 36°, or, better, of 40°B., the temperature being maintained below 15°C. (59° F.), needles are soon formed, which probably have the composition $Na_2S, 6H_2O$, but afterwards a magma of octahedral crystals of the composition $Na_2S, 9H_2O$ is observed. This composition was verified by analysis with a titrated solution of iodine. The sulphydrate of sodium, NaHS, was found to be uncrystallizable. The crystallized monosulphide of sodium is freely soluble in water, but little in caustic soda. The crystals obtained under the above-named conditions from an alkaline solution are therefore pure monosulphide of sodium.

At the meeting, held July 7th, M. P. Carles presented a note relative to the occurrence of the alkaloids in cinchona barks. He affirms the correctness of Howard's results, that they predominate in the outer portion of the bark. He also presented a note "On the artificial coloration of brandy by caramel, to give it the appearance of age." This may be detected by agitating a sample briskly with one-sixth of its volume of egg albumen and filtering, when brandy colored by caramel will retain its color, while the color will have disappeared if it was produced from the wood of the cask. Sulphate of iron produces in the latter a greenish-black coloration, but no change with the former. (The addition of a little tannin or infusion of oak-bark will produce a similar reaction in artificially-colored brandy.—EDITOR AMER. JOURN. PHARM.)

M. Thibault read a note stating, that in the tinned surface of a still he found 44·75 per cent. of lead. In a paper by M. Patrouillard, he objected to the use of the fluid extract of bitter orange peal for preparing the syrup, which does not represent the officinal; the latter made by infusion, gelatinizes from the separation of pectin, when acidulated with a little hydrochloric acid.

M. Petit stated that his experiments prove that 1 gram of ptyalin will dissolve from 10,000 to 20,000 grams of starch, producing an amount of sugar varying between 3,500 and 7,000 grams.

M. Latour gave an account of the researches on the composition of *bois d'acajou*, made by himself and M. Cazeneuve (*see* page 396).

EDITORIAL DEPARTMENT.

THE NEXT SESSION OF THE COLLEGES OF PHARMACY in the United States will commence October 1st, the California College of Pharmacy excepted, in which the vacation will commence about that time. We learn with pleasure that the prospects for a large attendance are quite promising, and that in nearly all the colleges improvements have been made, increasing the facilities for instruction. Students who contemplate attending the lectures we would advise to be promptly on hand at the *first* lecture, and would counsel a regular attendance throughout the entire course; they should remember that knowledge cannot be gained otherwise but by earnest labor.

A large number of students who intend to study at the Philadelphia College of Pharmacy have already been registered as applicants for situations, and it is to be hoped that pharmacists doing business in this city or in the neighborhood, if in need of assistants, will make early application to the Registrar of the College, Mr. Wm. C. Bakes, 1100 Arch street.

DAMIANA.—In our last number we gave a brief account of the claims which have been put forth for this new but unknown drug. On page 426 of the present number our readers will find an allusion to the same article, from which it would appear that this so-called damiana cannot be regarded in any other light except that of a proprietary medicine, shrewdly put upon the market. This view is strengthened by an editorial in the "Medical and Surgical Reporter" of August 14th, from which we give below an extract. Since no reliable information can be obtained from the proprietor of damiana in the Atlantic States, perhaps our friends in California may be able to enlighten us on the subject.

The "Medical and Surgical Reporter" has the following:

> Our application for samples of the extract was complied with by the proprietor of the preparation, for which courtesy we express our thanks. But he declined to state from what part of Mexico he obtained it, or through what channels of trade. He further added that no botanical specimen of the plant could be had.
>
> The extract sent us contained considerable alcohol, the effect of which must be allowed for. The amount of alcohol in a dose of the extract was fl.℥i or fl.℥ii.
>
> In two instances we administered a dessertspoonful of the extract three times a day, to healthy men, for three days. The result was null beyond a slight stimulation from the alcohol.

In three cases we administered two full bottles of the extract to men, from twenty-five to thirty-five, suffering from exhaustion of the generative powers, incident to excessive coition and self-abuse. From one of these we have not heard. The second reports, after using it steadily for three weeks, a loss of appetite, and 'so little improvement in the strength of the organs that he can hardly tell if there is any." The third, an intelligent gentleman, writes as follows: "I do not consider the damiana did me any good. It increased the desire for sexual congress during the first few days I used it; after that the inclination passed away, and now, after finishing the second bottle, I have no desire at all. I had intercourse once while using the first bottle, but did not observe any increase of strength in the organs."

MEDICATED WATERS.—In our last number we referred to the proposition of Mr. Shamalia for the extemporaneous preparation of medicated waters from volatile oils by means of animal charcoal. This substance has repeatedly been recommended for the purification of old resinified volatile oils, alone as well as in connection with borax and other substances. We were, however, not aware that it had been suggested as a medium for the purpose for which it was used by Mr. Shamalia until our attention was called to a paper by Mr. Jas. S. Talbot, published in the Boston "Laboratory" for September, 1874; he recommends to dissolve half a fluidrachm of the volatile oil in 20 minims of ether, to triturate the solution with one drachm of purified animal charcoal until the ether has evaporated and then to add gradually two pints of distilled water.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Proceedings of the Fifth Annual Meeting of the New Jersey Pharmaceutical Association, held in Morgan Hall, Camden, N. J., February 10th, 1875. Jersey City: "Jersey Times'" Print. 8vo, pp. 52.

We have, on page 134, briefly reported the transactions of this meeting. The pamphlet before us contains the minutes, address of the President, reports and essays read, one of which we publish in this number, and desire to direct the attention of our readers to it.

An Address delivered before the Massachusetts College of Pharmacy, at the Ninth Annual Commencement, on the Relations of Chemistry to Pharmacy and Therapeutics. By T. Sterry Hunt, LL.D., F.R.S. With the Valedictory to the Graduating Class of 1875, by Professor Wm. Bolles, M. D. Boston: May 30, 1875. 8vo, pp. 27.

We have already, on a former occasion (page 282), referred to these interesting addresses, of which the latter gives some good advice to the graduates, while the former is a brief but excellent review of the relations of chemistry to pharmacy and therapeutics.

Report of the Board of Commissioners of the Fifth Cincinnati Industrial Exposition, held under the auspices of the Board of Trade, Chamber of Commerce, and Ohio Mechanics' Institute, from September 2d to October 3d, 1874. Cincinnati. 8vo, pp. 335.

Besides the reports of the judges, &c., this volume contains special reports of experiments made with steam-engines, reaping machines, &c. A pamphlet has also been issued announcing that the Sixth Exposition will be held from September 8th to October 9th next, and containing the list of premiums which will be awarded.

Lehrbuch der Gährungs-Chemie, in elf Vorlesungen. By Dr. Adolf Mayer. Mit 23

Holzstichen. Heidelberg: Winter's Universitäts-Buchhandlung, 1874. 8vo, pp. 166. Price, 1 5-6 thaler.

The Chemistry of Fermentation, in Eleven Lectures. With 23 Wood-cuts.

The author has intended this work as a continuation of his larger work on agricultural chemistry, published a few years ago, and as an introduction into the technology of such trades in which fermentation is employed. Fermentation processes have been known since the remotest periods in history; but the definition of the term, as at present employed in science, has not been definitely settled. The class of fermentation processes, however, which are of importance in agricultural pursuits, may be defined as comprising those chemical alterations of dissolved organic compounds which occur under the influence of low organisms (fungi, bacteria) destitute of chlorophyll. In these cases fermentation is induced by what is termed *organized ferments*, while substances which induce chemical changes without the aid of organisms may be called *chemical ferments*. The author confines himself to the former class, and considers more especially alcoholic fermentation, which has been most frequently the subject of critical investigations. He reviews in a very engaging manner the older views concerning fermentation and allied processes, and enters more fully into the consideration of the various theories entertained since the time of Lavoisier, and into the gradual development of the views of Liebig and Pasteur, and the observations of other chemists. The adoption of Pasteur's views, that the production of alcohol from sugar is the result of the vegetation of low fungi, brings the author to the questions of spontaneous generation and the nature and life of low organisms, including their chemical constitution and development, all being critically and entertainingly considered. The last chapter is devoted to acetic fermentation, and briefly alludes also to certain changes occurring in wine, the production of lactic and butyric acids, and to other chemical decompositions which are asserted or believed to be due to fermentation.

We know of no other work which treats as fully and impartially of fermentation, nowhere hiding defects of investigations, or omitting to point out results, even though they might serve or be used as arguments in favor of theories opposite to the views of the author. It needs scarcely be stated here that the latest investigations have found a place in this work, which is so thorough and instructive, and at the same time so entertaining, that no reader will peruse it without satisfaction.

Anleitung zur Analyse der Aschen und Mineralwasser. Von Robert Bunsen. Mit einer lithographirten Tafel und sechs Tabellen. Heidelberg: Carl Winter's Universitäts-Buchhandlung. 1874. 8vo, pp. 64.

A Guide for the Analysis of Ashes and Mineral Waters. With one lithographic plate and six tables.

A work on analysis from the author's pen needs scarcely any words of commendation. The one before us is a reprint from the "Annalen der Oenologie," and from the "Zeitschrift für analytische Chemie." The first part treats of the analysis of ashes, under three headings: preliminary manipulation, analysis of the portion soluble in water and analysis of the portion insoluble in water. The second part, the analysis of mineral waters, describes: 1st, work at the mineral spring; 2d, analysis of the water, and 3d, calculation of the results. The work is intended for those who are already acquainted with chemical analysis and accustomed to exact-

ness. It describes the course to be pursued and points out the sources of possible errors, and the manner in which they may be avoided; also, the principles upon which the grouping of the determined elements into salts should be based.

Dr. P. Schuh's Reference Table, for the convenience of Druggists and Physicians in referring to Doses, Incompatibles, and Antidotes of Poisons, Drugs and Chemicals. Philadelphia. Price, $1.

The table is mounted upon both sides of paste-board, and is evidently intended to be hung up near the prescription-counter, or in the office of the physician, so that it may be conveniently referred to. On one side we find tables of doses, of apportioning doses, of avoirdupois, troy and metrical weights, of apothecaries' and approximate measures and Procter's and Parrish's tables of drops.

The first one mentioned comprises only the more powerful medicines, opposite the names of which marks are placed to indicate whether they are severe poisons, poisonous, narcotic poisons, slightly narcotic, emetic or cathartic and drastic. Acetic acid, the iron salts, ferrocyanide of potassium, and others, are marked poisonous, and among the narcotic poisons we find camphor, lobelia, &c., while such powerful drugs as colocynth, elaterium, gamboge, veratrum album and ver. viride are merely marked drastic, or emetic and drastic. The doses indicated are those ordinarily given, up to the largest that may be safely administered to adults. In some cases however the latter are decidedly too low, like morphia and its salts, opium, &c., the largest dose of the former being given as ¼ gr., and of the latter 1 grain.

The reverse side of the table gives the general treatment in cases of poisoning, together with the special antidotes; also a list of incompatibles. In such lists many articles are usually mentioned which are perhaps never combined together, and inconsistencies can scarcely be avoided. We find them also in this table. We do not know upon what ground sulphuric and nitric acids are considered incompatible with citric acid; or nitric and muriatic acids with sulphate of potassium. Baric chloride is mentioned as being incompatible with sulphate of sodium, but is not found among the incompatibles of sulphate of potassium. Instead of naming iron salts generally as incompatible with nut-gall, ferrous iodide alone is mentioned. Chlorides and astringents are enumerated among the incompatibles of nitrate of silver, which is likewise precipitated by iodides and bromides, and decomposed by nearly all tinctures and infusions.

That the nostrums svapnia and chlorodyne have found a place in the table of doses, is hardly consistent with the care shown in the selection of the drugs.

This reference table has evidently been prepared with a great deal of care, and much labor has been bestowed upon it; its arrangement is very convenient, and by the use of different types, the various parts strike the eye very readily. Pharmacists and physicians will find it to give ready information on many points, for which usually books—and often bulky works—have to be consulted.

A Clinical Contribution to the Treatment of Tubal Pregnancy. By T. Gaillard Thomas, M. D. New York: D. Appleton & Co., 1875. 8vo, 11 pages.
A reprint from the "New York Medical Journal" for June, 1875.

CORRECTION.—Our readers will please correct the following figures:
Page 208, line 10 from top, read 1·502 instead of 1·052.
" 343, " 16 " " " 180° " " 108°.